APRIL 12, 1954

NEWS ISSUE

Electrical World

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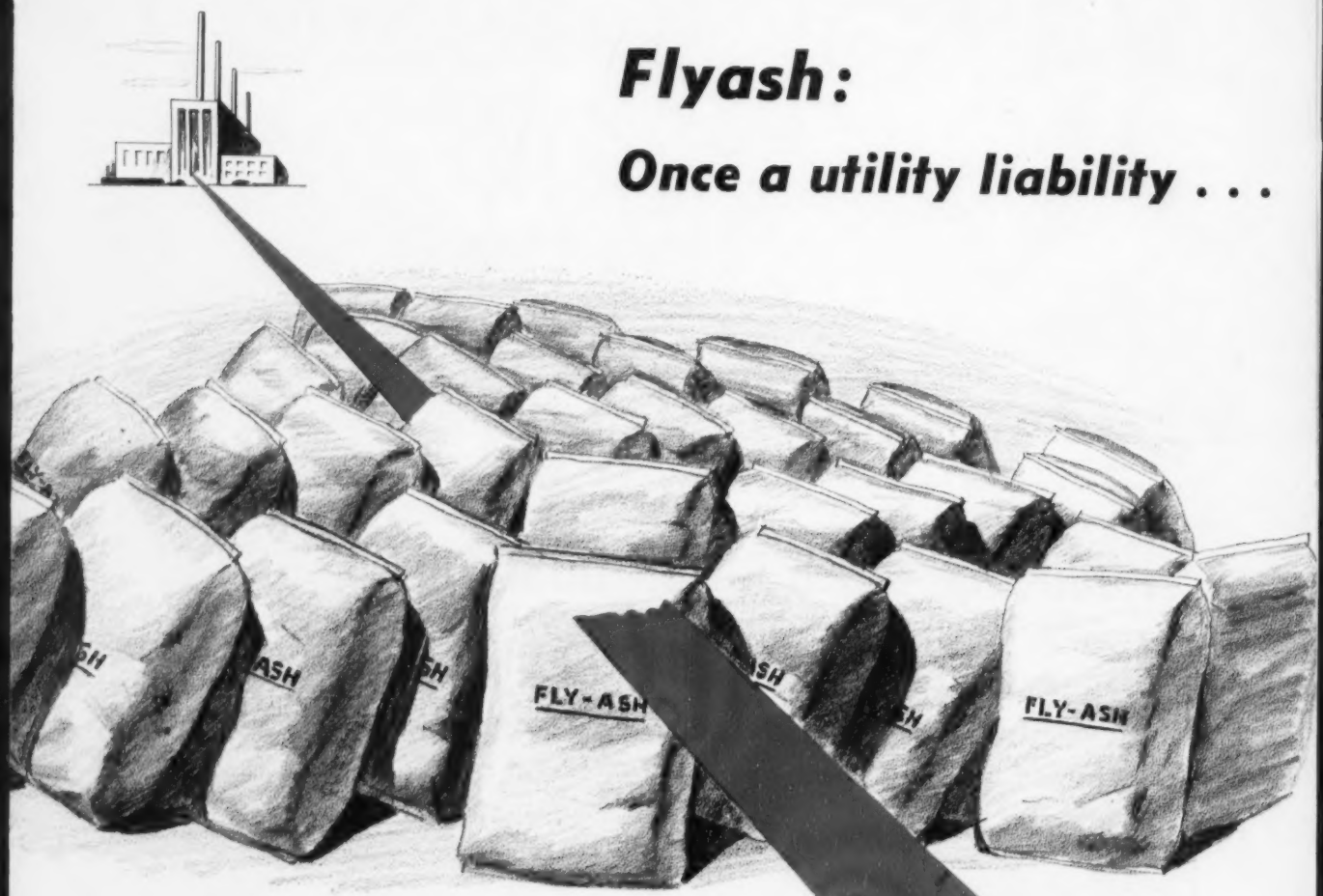

Flyash:

Once a utility liability . . .

. . . now promises a new source of income.

Detroit Edison tells how it sold 90,000 tons to other industries

See page 42

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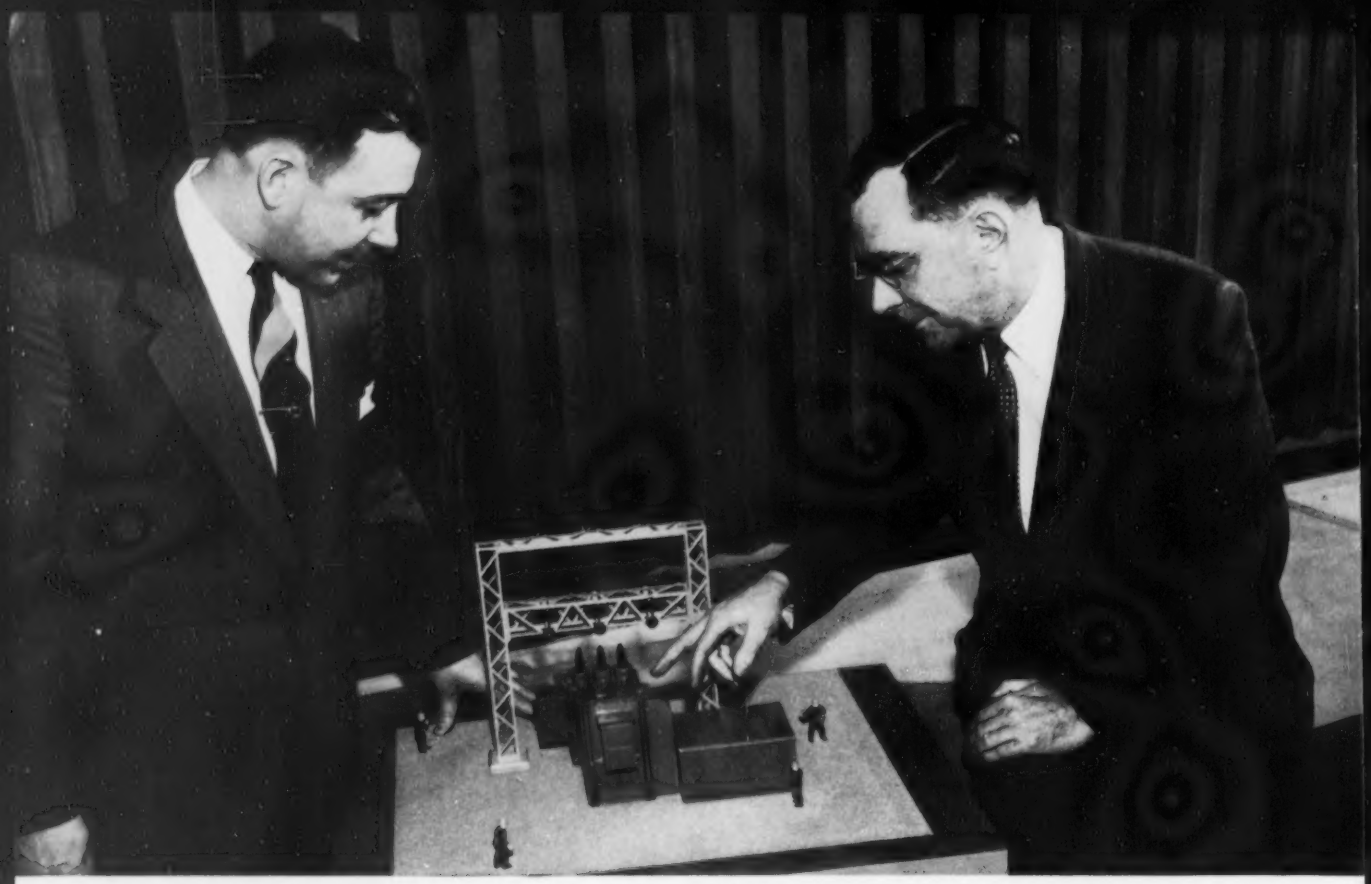
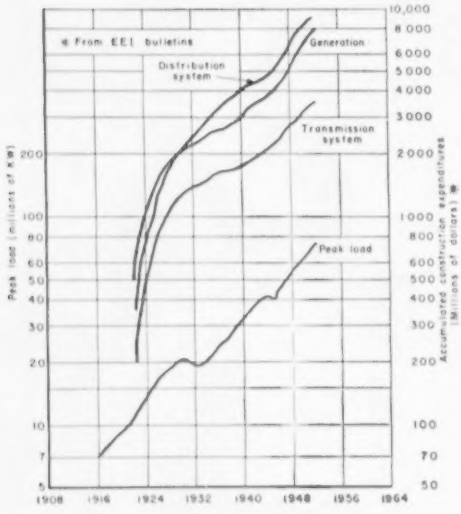


PACKAGED SUBSTATIONS, like model, can be used by utilities as economical building blocks to reduce distribution investment. O. B. Falls, Utility Sales Manager (left), discusses substation layout with W. J. McLachlan, Electric Utility Engineering Manager.

Reducing distribution cost means major savings on largest part of system investment

Advance planning and building block expansion cut investment in 44% of total system



DISTRIBUTION INVESTMENT, largest single utility item for over 20 years, amounts to a billion dollars annually, is now increasing faster than peak load.

With one billion dollars a year being spent nationally by utilities for adequate distribution facilities alone, distribution is more and more the "big business" of system investment.

GREATEST SHARE

The largest single item of system cost since the early 1930's, distribution now represents a 44% share of system investment, compared with 39% for generation and 17% for transmission. Thus a utility, in constantly seeking means to reduce its greatest expense, can cut down its entire system cost proportionately.

The two important steps of (1) advance system planning, and (2) use of standardized, factory-built substations as building blocks offer a number of economies. For example, a utility's engineers, once relieved of costly substation design detail, are freed for important work of system planning for service in the years ahead. And smaller building block substations add capacity only as needed, save thousands of dollars a year by deferring investment.

ECONOMICAL EXPANSION

In working with electric utilities on distribution problems for the past 25 years, General Electric has consistently pioneered economical system expansion using the building block approach. Detailed methods are discussed in GEA-5847, "How To Reduce System Investment." For your copy, write Sect. 301-259, General Electric Company, Schenectady 5, N. Y.

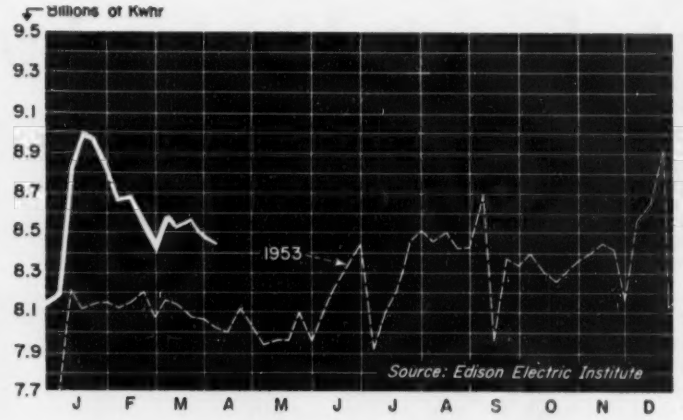
MORE POWER TO AMERICA

GENERAL ELECTRIC

VOLUME 141, NO. 15

April 12, 1954

Electrical World



Output Week Ended Apr. 3—8,463,000,000 Kwhr

Seasonally Adjusted Index†—164.2

Per Cent Change From Previous Year

	Total US	New Eng.	Mid. Atlan.	Cent. Ind.	West Cent.	South-east	South Cent.	Rocky Mount.	Pacific NW	Pacific SW
Apr. 3	+5.5	+3.9	+2.2	−1.8	+10.7	+19.9	+8.7	+4.5	+8.7	−3.6
Mar. 27	+5.2	+0.8	+1.4	−2.0	+11.6	+18.2	+13.0	+3.4	+6.7	−2.2
Mar. 20	+6.1	+2.0	+1.8	−1.3	+11.8	+22.1	+9.0	+3.3	+7.0	+0.1

Electric Power Statistics

		Latest Month	Preceding Month	Year Ago
Peak Load (Million Kw)	Jan.	81.1	81.2	74.9
Capacity (Million Kw)	Feb.	92.46	91.68	82.83
Production (Billion Kwhr)	Feb.	35.21	39.42	33.60
Hydro	Feb.	8.56	8.90	8.99
Fuel	Feb.	26.65	30.52	24.60
Fuel Consumption				
Coal (Million Tons)	Feb.	9.07	10.92	9.16
Oil (Million Barrels)	Feb.	5.70	8.29	6.81
Gas (Billion Cu Ft)	Feb.	75.74	67.41	57.82
Sales (Billion Kwhr)	Dec.	32.31	31.59	31.20
Residential	Dec.	9.77	9.02	8.91
Commercial	Dec.	5.60	5.50	5.21
Industrial	Dec.	14.83	14.95	15.11
Other	Dec.	2.12	2.12	1.98
Net Income Class A & B Companies ($Million)	Dec.	105.32	84.26	101.50
Estimated Dec. '54 Peak (Million Kw)	Jan.	93.4	94.0	96.1
Kwhr per Residential Customer (12 Month Average)	Dec.	2,345	2,331	2,169
Revenue per Kwhr Residential Service (12 Month Average)	Dec.	2.74¢	2.75¢	2.77¢
Canadian Production (Billion Kwhr)	Jan.	5.63	5.72	5.66

Business Statistics

FRB Industrial Production Index†	Feb.	125*	124	136
Gross National Production Annual Rate ($ Billion)	4th Qtr	363.5	369.5	361.1
EW 4 Industry Production Index†	Feb.	114.6	117.3	125.4
ENR Construction Cost Index††	Mar.	128.7	128.9	123.2
BLS Consumer's Price Index	Feb.	115.0	115.2	113.4
NEMA Insulation Materials Sales Index†	Jan.	124	133	174
NEMA Electric Appliance Sales Index†	Jan.	90	69	116
NEMA Household Refrig. Sales Index†	Jan.	95	53	93

*Preliminary **Revised †1947-49=100 ††1949=100

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Here's Proof of Performance...

Replacements have been few in this 38-year-old line of CREOSOTED poles

CLOSE-UP of one of these 38-year-old creosoted poles.

IN THE MERTENS-TO-MALONE LINE of Texas Power and Light Company, 94% of the Creosoted poles installed in 1916 are still in service.

TEXAS Power and Light Company has had excellent performance from poles treated with Creosote on many locations in its far-flung system. For example, the long life in the section between Mertens and Malone is outstanding.

In 1916, 196 Southern Yellow Pine poles, treated with Creosote, replaced untreated poles that had given less than 15 years' service. To date, only about six per cent of these poles have been replaced, and most of the replaced poles were casualties from reasons other than decay.

Texas Power and Light Company feels that there are at least 10 years of life left in the remaining poles, and when they are replaced, poles treated with Creosote will be used again.

Creosote's combination of toxicity and permanence is the reason why it has established so many service records like this. And service records, after all, are your best assurance of future performance from a wood preservative.

You can take an additional step toward finest performance by specifying USS Creosote. USS Creosote is the uniform product of continuous tar processing in the plants of United States Steel. For further information, contact our nearest Coal Chemical sales office or write to United States Steel Corporation, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

USS CREOSOTE

UNITED STATES STEEL

THE ELECTRICAL WEEK

The Issue's News Highlights . . . House followed main recommendations of Appropriations Committee in slashing $58 million from President's funds request for Interior.

Supreme Court upheld FPC license granted Tacoma for Cowlitz project by refusing Washington State Game Commission's plea for review of lower court decision which held the license was valid.

Explosion of two 100,000-kw generators at Ontario Hydro's Hearn Steam Station within four days caused damage estimated at $1.6 million.

Bonneville Power Administration may have to raise its rates next year, but the Pacific Northwest will have "relatively cheap power" for years to come, Administrator William A. Pearl asserted. He spoke at the 13th annual convention of Northwest Public Power Association in Tacoma, Wash.

Another atomic battery has popped up—this one at Tracerlab, Inc. The battery, which in a demonstration triggered a photoflash bulb, uses a relatively harmless tritium isotope as source of initial power.

The Russians are using an extrusion press to apply aluminum sheath directly to a power cable without burning the insulation, a British delegation reported on its return from the Soviet Union.

Formation of a Puget Sound area power pool to work within the existing Northwest Power Pool was proposed by Dr Paul J. Raver, superintendent of Seattle City Light. Principle members would be Seattle and Tacoma City Lights, with other private and public utilities in the area joining in.

Tacoma Public Utilities Board directed its newly appointed superintendent, H. A. Cole, to draw up a five-year program to double the system's generating capacity. Purpose: To remove city's reliance on BPA.

Florida P&L saved $2,450 on the mailing of its annual reports this year, according to Pres McGregor Smith. Gimmick: Reports, unwrapped, were mailed at bulk rate, saving 7¢ a copy on 35,000 copies.

India signed an $11 million aid agreement with the U. S. to finance irrigation and power projects at Pipri, 100 miles south of Benares. The money, which brings U. S. aid for these purposes to more than $21 million, will help develop 240,000 kw of power.

Arizona Legislature passed and sent to the governor a bill aimed at preventing municipally owned utilities from competing with privately owned public utilities. If a municipal utility wants to extend its service into an area served by private firm, the bill requires the municipal to acquire the private facilities.

Off the Washington Wire . . . Bureau of the Budget, which is the voice of the White House in such matters, refused to recommend federal development of the Hells Canyon site in Idaho until FPC decides the case. Thirteen Senators backing the high dam interpreted this to be "additional proof of the Eisenhower Administration's private utility philosophy."

AEC announced three new studies looking toward development of economic nuclear power plants. Agreements have been completed for separate studies by Babcock & Wilcox Co of New York, Bendix Aviation Corp of Detroit, and American Machine & Foundry Co of New York.

REA will begin dipping into its contingency fund by early next month for rural electrification loans. This means that some states will have exhausted their loan allocations. REA Administrator Nelsen said the agency may loan as much as $150-165 million during the current fiscal year—which will mean using $15-30 million of the contingency fund.

Reclamation Bureau awarded an $852,517 contract to Stolte, Inc, of Oakland, Calif., for completion of Folsom Power Plant near Sacramento.

Dairyland Power Cooperative of Lacrosse, Wis., received an additional $9.6 million REA loan for installation of a 50,000-kw steam generating unit and construction of 50 miles of 138-kv transmission line.

In the first quarter of 1954 the electric industry sold publicly a record $625 million in securities, $40 million of which was for refunding purposes, Reis & Chandler, Inc, announced. This compared with $439 million in the same quarter last year, of which only $2 million was for refunding.

Indianapolis P&L is planning to split its common stock on a 2-for-1 basis.

The hassle is over at Dover. The Delaware city will furnish power to Dover Air Force Base, but will get it from Delaware P&L and use lines the private company built to the base. The compromise ended a long-standing argument between the two utilities.

Executive Changes . . . Public Service Co of Indiana elected Edmond W. Hebel and David P. Pardee as executive vice presidents. Earl H. Conway was elected vice president and comptroller; Joseph J. Trainor, vice president of engineering; and Robert McMurray, vice president of sales . . . Charles H. Whitmore was named president of Iowa-Illinois G&E to succeed C. P. Conrad, new board chairman. The utility also elected H. A. Kleinman and R. Hovey Tinsman as vice presidents . . . H. B. Abbott-Smith was appointed a vice president in charge of Shawinigan Water & Power Co's power sales department.

Interior Budget Request Cut by House

- **President's recommendations for the department are slashed $58 million—from $422 million to $364 million**
- **Strict adherence to Administration power policy and personnel cutbacks are outlined in report accompanying funds bill**

Personnel cuts and tighter power policy for Interior Department agencies were main points of argument last week during House debate on the fiscal 1955 appropriation bill for the department.

In drafting the bill, the House Appropriations Committee made sharp cuts in the President's budget estimates and emphasized strict adherence to Administration power policy. Democrats tried hard to soften the cuts for power agencies, but the House passed the bill pretty much as the committee had written it.

Power agencies shared heavily in the $59 million slashed from the departmental budget total by the committee. The committee bill recommended $363 million for the department, as compared with $422 million requested in the January budget message. The House restored $977,000, voting a total of $364,337,989 for Interior.

Curb on SPA Lifted

Deep personnel cutback recommended by the committee for Southwestern Power Administration was revised by the House. Committee report accompanying the funds bill stipulated that SPA could not use more than $550,000 for personal services. This sum would pay for 86 employees that would be left on the payroll after reduction to this level, as recommended in a recent survey report to Interior. House, however, knocked out this stipulation and increased total funds available for SPA from $275,000 to $625,000.

The committee called for a similar cut in personnel by BPA and this time the House went along. An overall appropriation of less than $19 million was recommended for construction, compared with more than $30 million requested. The report directed BPA to reduce its payroll in line with this big program cut, specifying a limit of $6 million for personal services.

Three significant policy directives were spelled out by the House committee in its report. The first and most important requires Federal Power Commission approval of rates for power from dams built by the Corps of Engineers.

Under the other two directives, the funds were set up for SPA to lease Rural Electrification Administration cooperative lines in its territory. Stipulation was inserted that no money be made available to construct facilities that local utility interests, public or private, were willing to build.

On construction allocations for Bonneville, the committee eliminated the $2.6 million budget request for The Dallas project and cut $2 million off the $6 million asked for the Chief Joseph-Snohomish transmission line. Both of these actions were based on committee belief that construction could be slowed down in accordance with the schedule for generator installation at the dams.

Biggest part of the overall $15-million reduction for the Bureau of Reclamation is an $11.6 million cut in construction funds. The Missouri diversion dam and power plant in northeastern Montana were knocked out completely, and the transmission division of the Missouri River basin project was reduced from $13 million to $11 million. Eklutna power project in Alaska took a heavy cut, reducing the $4.6 million budget request to less than $1.2 million.

On California's Central Valley Project, the committee specifically struck out a $99,000 request for the new $182 million Trinity Division. That decision was based on committee policy to withhold money for projects costing more than $5 million that have not been authorized by legislation.

Lease-Purchase Contracts

Much of the House debate on the bill centered around SPA funds for purchase of power and lease of transmission lines from five generating and transmission cooperatives in Missouri and Oklahoma. These co-ops were deprived of lease-purchase contracts with SPA by House action last year, and are now leaning on interim contracts with the Interior agency.

House approved $147,000 allowed by the committee for lease of lines from those co-ops during fiscal 1955.

At hearings in mid-February spokesmen for both the co-ops and a number of electric companies in the area told the committee that contracts are being negotiated to provide for the integration of the co-op systems into the area power systems. Company spokesmen headed by Richard L. Arnold, general counsel for Southwestern Gas & Electric Co, indicated some of these contracts might be concluded sometime this month. However, the co-ops leaders were much less optimistic.

In a statement at the hearing, War-

Fiscal '55 Appropriations Recommended for Interior Department Power Agencies

	Budget Request	House Action	Decrease
Bonneville Power Administration	$36,800,000	$23,915,000	$12,885,000
Southwestern Power Administration	1,030,000	625,000	405,000
Southeastern Power Administration	1,450,000	1,228,000	222,000
Bureau of Reclamation	155,292,000	140,179,700	15,112,300

Four Acres of Electronic Exhibits

Four acres of floor space on one level were covered by exhibits on display at the Institute of Radio Engineers Show held last month in New York City at the Kingsbridge Armory, in the Bronx. Six hundred and four exhibitors displayed electronic equipment valued at $10 million at the show. More than 40,000 persons (an IRE record) attended the technical sessions and visited the exhibits.

ren L. Porter, vice president of Kansas City Power & Light Co, outlined a tentative arrangement for integration of co-op and company facilities in western Missouri where the N. W. Electric Power Cooperative and Kamo Electric Power Cooperative are now operating transmission and thermal generating plant facilities.

Principle features of the proposed agreement are these:

- N. W. will purchase power from SPA at the 161-kv bus at the Bull Shoals project.
- N. W. will lease to the electric companies its 154-kv transmission line from Bull Shoals to Missouri City, and Missouri City substation.
- N. W. will sell to electric companies all the power at its disposal, including the output of its 40,000 kw steam plant at Missouri City, as scheduled by electric companies.
- Out of their total power and energy resources, the electric companies will sell to N. W. at Missouri City all of the requirements of N. W.'s member distribution co-ops.
- The electric companies will likewise supply to Kamo the requirements of Kamo's member cooperatives at agreed delivery points on the integrated system.

Once consummated, the N. W.-company agreement is expected to set a pattern for the negotiation of other integration contracts in Missouri and Oklahoma. Other G&T co-ops in a similar situation are Central Electric Power Cooperative of Jefferson City, Mo., M. and A. Power Cooperative of Popular Bluff, Mo., and Western Electric Cooperative of Anadarko, Okla.

The previous week the House held fast to committee recommendations on Tennessee Valley Authority Funds, but threw out two attempts to write legislation into the bill. It voted $103.5 million for TVA for the next fiscal year—a cut of $38.2 million below budget recommendations. No funds were provided for the controversial Fulton steam plant.

But the House failed to uphold committee recommendations that TVA be required to pay interest on its power investment or that its authority over power resale rates be rescinded.

Cowlitz License

. . . issued Tacoma by FPC affirmed as Supreme Court denies state game commission writ of certiorari

Supreme Court has upheld Federal Power Commission license issued to the city of Tacoma for its 345,000-kw Cowlitz hydroelectric project on the Cowlitz River.

In denying a writ of certiorari to the Washington State Game Commission, the high court thus affirmed the ruling of the Ninth Circuit Court of Appeals which said the license was valid.

Unless a petition for reconsideration is filed, the action is final.

Issues . . . At issue in the case were:

- Whether the Federal Power Act requires an applicant for a license for a hydroelectric project to comply with various state laws designed to conserve fishery resources in the river involved.
- Whether FPC properly concluded that the Cowlitz development, as licensed, is best adapted to a comprehensive plan of development in light of a potential loss of fishery resources.

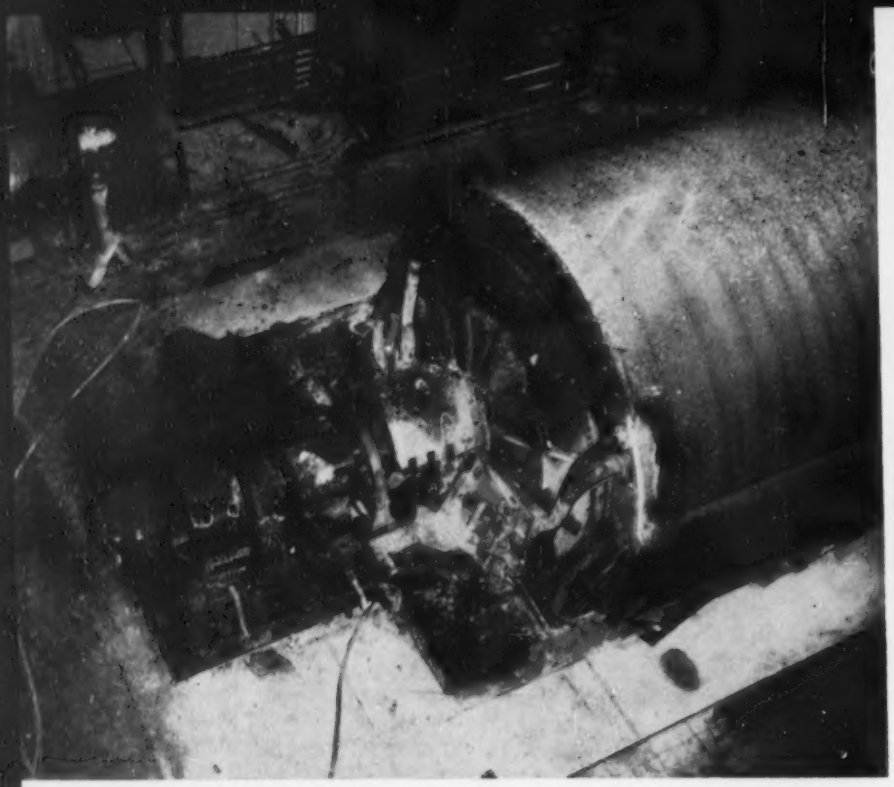
FPC Stand . . . In opposing the game commission appeal, FPC argued there was no conflict between the Supreme Court decision in the Niagara Mohawk Power Corp case (EW, March 22, p 92) and the appeals court decision upholding the license for the Cowlitz project.

In its brief FPC said:

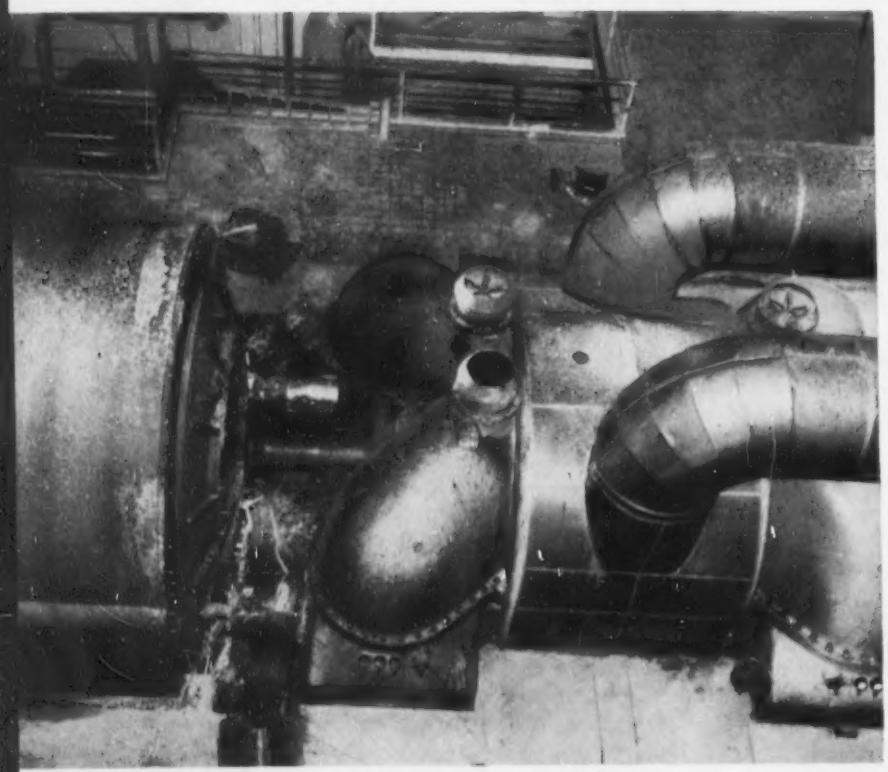
"The rights under state law sought to be asserted in Niagara Mohawk do not relate to regulation of the use of waters of the Niagara River, as in the case here, but rather were certain usufructary rights allegedly valid under state law to generate power with these waters."

The commission noted that while the Niagara Mohawk decision had saved the usufructary rights from supersedure by the Federal Power Act, it expressly recognized:

". . . when state law or regulation conflicts with the act, or with any lawful federal regulatory action, or with lawful terms of a federal license, state authority must yield to federal as the Supreme Court held in the First Iowa case."



2 Explosions Shut Down Toronto Steam Station



Pictures at left show damage to Hearn Station's No. 1 generating unit as a result of an explosion the morning of April 1

Two apparently similar generator explosions, the first on April 1 and the second four days later on April 5, have resulted in the complete shutdown of Richard L. Hearn generating station of the Hydro-Electric Power Commission of Ontario at Toronto. Each of the two explosions was accompanied by fire. The first involved Unit No. 1, a 100,000-kw unit originally rated 88,000 kw at 25 cycles but subsequently converted to 60 cycles and re-rated. The second explosion involved Unit No. 2, adjacent to the first, a 100,000-kw 60-cycle unit.

Investigation Under Way . . . Both explosions are said to have occurred under similar conditions. The first was originally described by a commission spokesman as associated with the hydrogen cooling system of the generator. However, following the second, this explanation was withdrawn, pending a complete and detailed investigation. At present a three-sided investigation by Ontario Hydro, C. A. Parsons & Co, British manufacturer of the machines, and the Stone & Webster Engineering Co, station designer, is in progress. Preliminary investigations now indicate failure may have been of a mechanical nature.

The April 1 explosion occurred at 6:14 a.m. reportedly 19 minutes after Unit No. 1 had been started. Fire spread quickly to the five floors of the plant causing damage estimated by Commission Chairman R. H. Saunders at $800,000. Following the explosion the remainder of the plant was shut down as a precautionary measure. However, Unit No. 4, a 100,000-kw 60-cycle machine, was back in service by 11 a.m. and Unit 2 during the afternoon. Unit No. 3, an 88,000-kw 25-cycle machine is currently being converted to 60-cycle operation. When all four units are operating at 60-cycles the station will have a total capacity of 400,000 kw and will cost $56,500,000 fully incorporated into the system.

Second Explosion . . . The April 5 explosion, of an apparently similar nature, according to a spokesman, affecting Unit No. 2, occurred at 10:58 a.m. while technicians were at work on

Hearn Steam Station Is Canada's Largest

The 400,000-kw Richard L. Hearn Station is Canada's largest steam generating station. It is located in the eastern area of Toronto's (Lake Ontario) water front and was erected to provide energy for the highly industrialized southern Ontario region.

The in-service dates were as follows: Unit No. 1, Oct. 27, 1951; Unit No. 2, Feb. 4, 1952; Unit No. 3, Nov. 12 1952; and Unit No. 4 late in 1953.

Units 2 and 4 have a capacity of 100,000 kw at 60 cycles. Units 1 and 3 were erected as 88,000-kw units at 25 cycles. Both are to be converted to 100,000 kw at 60 cycles. Unit 3 is now being changed over.

the adjacent generator No. 1 making a detailed examination of the damage and restoring the building. The second explosion was termed remarkable in that damage was confined to the immediate area only. The remaining operative unit, No. 4, was shut down immediately for precautionary reasons. Damage from the second blast was estimated at $800,000 in addition to the $800,000 loss of the previous week, all covered by insurance.

It was announced immediately by Saunders that Hearn Station has been shut down for an indefinite period while a thorough investigation is conducted to determine the cause of the outbreak and ascertain the extent of the damages. Saunders said, "It was extremely fortunate that while lives of commission employees were endangered by the blast, only two required hospitalization for shock."

Saunders pointed out that on both occasions the commission's interconnection with American utilities had enabled Ontario Hydro to carry its load without interruption to service. On the morning of April 5 Ontario Hydro received 180,000 kw from neighboring American systems. Of this 160,000 kw was supplied by Detroit Edison Co over the new Ontario-Michigan interconnections officially placed in service last December (EW, Feb. 15, p 42). In addition 20,000 kw was supplied by the Niagara Mohawk Power Corp. On April 1 the commission received 190,000 kw over the interconnection from Detroit Edison.

Neyland Is Mentioned for TVA Chairmanship

The White House is considering naming Gen Robert R. Neyland, popular University of Tennessee football coach, as chairman of the board of Tennessee Valley Authority.

Republican Sen John S. Cooper of Kentucky has been consulted on the Neyland candidacy and is believed to have no objections. Tennessee's Democratic Senators Estes Kefauver and Albert Gore, both University of Tennessee alumni, would find it difficult to object to the appointment.

If named, Neyland would replace TVA Chairman Gordon Clapp, whose term expires May 18.

Republican backers of Harry C. Carbaugh, Chattanooga business man, for the TVA job, have indicated that he is now out of the race. Opposition to Carbaugh's appointment came from those who believed politics should be kept out of the TVA board appointments. Carbaugh was a member of the National Republican Finance Committee.

Neyland, who says he has no political affiliations, is a retired Army engineer. He was graduated from West Point in 1916, a year behind President Eisenhower. He retired as head football coach at University of Tennessee last year, but continued as athletic director. A one-year leave of absence granted Neyland because of ill health was extended for another year last February.

Tests on 275-Kv Cables Undertaken in Britain

British Electricity Authority last month started operations at a cable testing station at Staythorpe power station, Nottinghamshire. Test lengths of 275-kv cables submitted by three British manufacturers will be subjected to intensive field trials.

The cables are connected in series with one phase of the 275-kv overhead line linking Staythorpe and West Melton and are the first cables of this voltage to be put into commercial operation in Britain.

POWER BRIEFS FROM THE NEWS

● Kentucky Public Service Commission has authorized East Kentucky Rural Electric Cooperative to install a 66,000-kw unit at its Ford plant in Clark County. Originally the co-op planned to add a 40,000-kw unit at the steam station. Two 20,000 kw units are under construction at the plant now.

● Representatives of Canadian statistical bodies, governmental commissions, and power companies visited New York last month to confer with Edison Electric Institute officials on the methods EEI uses in compiling its semi-annual power surveys.

● A subcommittee of House Interior and Insular Affairs Committee will conduct hearings on proposed $200-million Trinity River Water and Power Project in California this month. Hearings will be held in Redding April 16 and in Fresno April 17.

● Clark County (Wash.) PUD's request for a public hearing on cost allocations made on McNary Dam has been rejected by the Federal Power Commission. FPC contends its decision to charge 92% of dam's construction costs against power generation is not subject to review of the courts. Commission also maintains there is no provision calling for public hearing of pending measures.

● "Fitting Wind Power to the Utility Network" is the title of a new monograph available free from Federal Power Commission. It was written by Percy H. Thomas, a retired Federal Power Commission engineer.

● Opening of temporary headquarters in Chillicothe, Ohio, is planned by Ohio Valley Electric Corp, operator of two electric generating plants now under construction which will supply power for Atomic Energy Commission's Pike County plant. Later OVEC plans to build permanent offices near the AEC plant.

● Ohio Edison Co expects to build a $16-million addition to its Edgewater power plant in Lorain. The addition will house a 90,000-kw turbogenerating unit which will generate almost as much power as the plant's three operating units' total capacity of 99,000 kw. Construction will start this fall.

IN THE INDUSTRY

The "Electric Power and Communications Initiative Act" has been prepared for submission to the Idaho electorate (EW, Feb. 15, p 5). But now the backers have the job of getting at least 25,700 verified and qualfied signatures. Then it must be filed with the Secretary of State by July 2. The bill, whose makers hope to see on the ballot on Nov. 2, goes about as far as public power planners could ever hope to go. The measure would create a new state commission to "take over" the electric power, telephone and telegraph companies and conceivably radio, television, and newspaper systems in the state.

How far can the public power advocates go?

New State Commission Would Be Supreme . . . The state commission would be beholden only unto itself inasmuch as there would be no limit on its power to:

- Acquire, construct and operate facilities.
- Set the rate structure.
- Make contracts and agreements with out-of-state agencies.
- Hire and discharge employees "at the discretion of the commission."
- Incur indebtedness "by resolution of the commission," to be repaid from power and communication revenues or from appropriations authorized by the state legislature.
- Condemn property through the right of eminent domain that not even an appeal to the state supreme court "shall operate to prevent or delay."

Except in eminent domain proceedings, the bill contains no provisions for any appeal from any of its actions.

To insure that all angles will be covered, the act "is intended to provide for the exercise of all of the legislative authority made available under the Constitution, but shall not be construed as being otherwise limited thereby." And except as otherwise provided in the act, "the authority of the commission shall not be restricted by any other law."

Purposes Sound Noble . . . The purposes of the initiative measure sound noble indeed. The act would "provide a more adequate supply of electric energy" which "shall be made available at the lowest possible cost." It would "develop water resources on a comprehensive basis for the production of electric energy" and "insure the distribution without surcharges and without discrimination." By passing the measure the people of Idaho would "realize the benefits by insuring their effective control of the agencies which produce, transmit, distribute, and sell electric energy and communications."

To attain these and other "benefits," the act maintains that electric power and communications must be produced by the state and distributed through locally controlled municipal and other public agencies.

The electric power and telephone companies operating in Idaho have formed a committee on publicity and education and working through the state chamber of commerce, prepared a booklet on the proposed public power initiative. It is entitled "The Proposed Electric Power and Communication Initiative Measure and What It Means To You."

The booklet points out what this committee considers to be errors of fact and mistaken ideas as to benefits theoretically to be provided by the proposal itself.

The position being taken by the utilities serving the state is brought out by these statements to Electrical World:

Kimball I. Jack, Washington Water Power Co, which serves parts of northern Idaho, and has the Cabinet Gorge power plant in northern Idaho said: "Officials of communications services are watching the initiative with interest."

W. R. Jarmon, president of General Telephone Co, which serves a number of small communities in eastern Washington and northern Idaho, said: "The committee isn't all-out opposing the power initiative. We are trying to see that information gets out to the public. We are assisting chambers of commerce in getting information."

An official of the Utah Power & Light Co said: "We are simply awaiting developments on the situation. From what we have learned, there is little real activity towards fostering the initiative. We are somewhat on the fringe, serving only a portion of Idaho. But of course we will cooperate with the Idaho Power Co if any action on our part seems called for."

TECHNICAL NOTES

ARCHER E. KNOWLTON

Transmission line joints were found by bolometer test of 3,500 to be faulty in 2% of the total.

Rectifier tube replacement twice a year in electronic control equipments may be cheaper maintenance than replacement of selenium rectifiers every two years.

Large turbines can be made more efficient than smaller ones largely because of reduction in ratio of leakage areas to nozzle and bucket areas.

Cross-the-Channel cable for 100 Mw at 132 kv has had $1 million allocated for its study by Britain and France. Capability of the four proposed single-conductor cables would be quadrupled by applying dc.

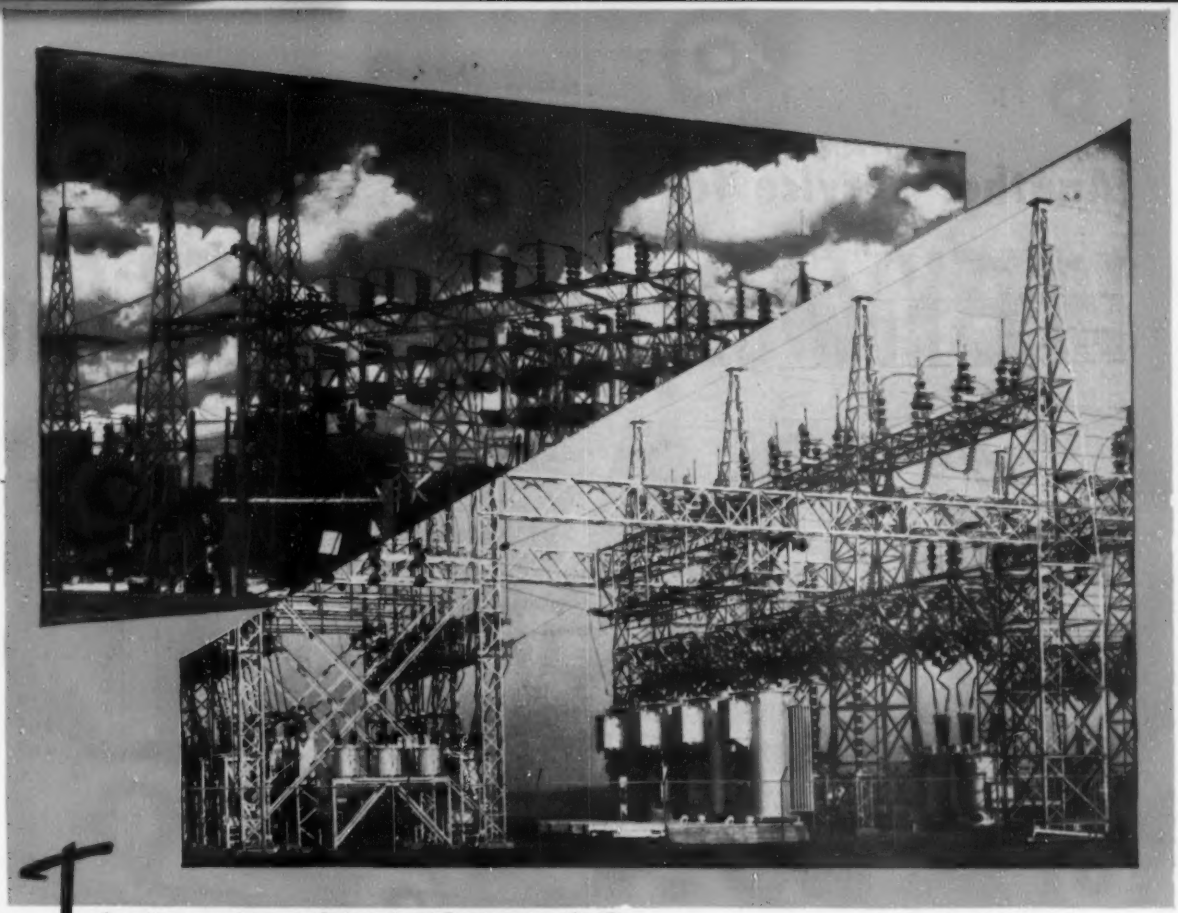
Chromic acid may prove an effective additive to prevent corrosion of gas turbine blades from sodium sulphate in the oil fuel.

Gantry towers with 120-ft spans are being used in an experimental line for study of the 275-kv line projected for the British grid.

Reserve percentages of yore may never again be tolerated by managements. It behooves operators to learn how to cool off units quickly and safely for overnight maintenance and how to get them back on the line promptly and safely the next day.

Primary networks tend to become uneconomical at 15 kv largely because the circuit breakers must have relatively high interrupting capacities.

Stethoscope test is unreliable after electric shock. Other usual tests for life are not dependable in cases where the shock has paralyzed nerve centers.



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to reduce engineering costs — save your time

Delta-Star has been designing and building substations for the nation's expanding utilities for more than 30 years—and many of these stations have been repeat orders from companies who are more than satisfied with Delta-Star's resources and service.

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Another service for industry

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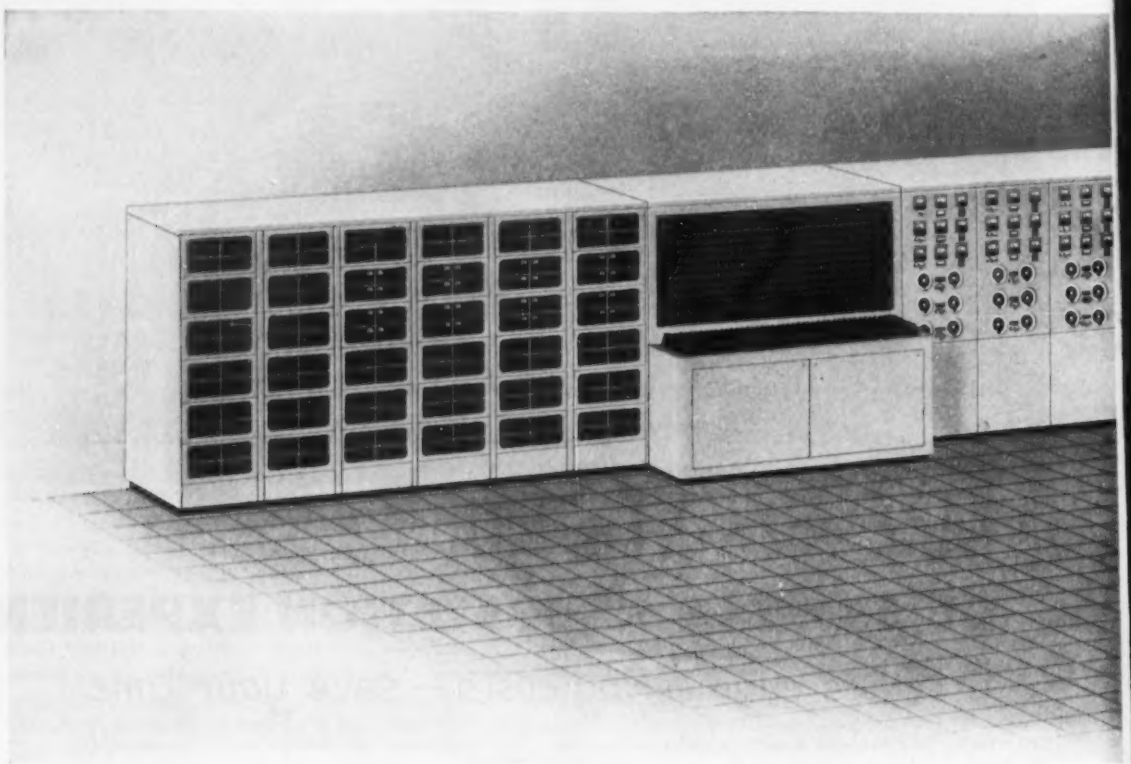


I-T-E System Analyzer, with console metering desk, arranged for 21 generators and approximately 450 circuit components.

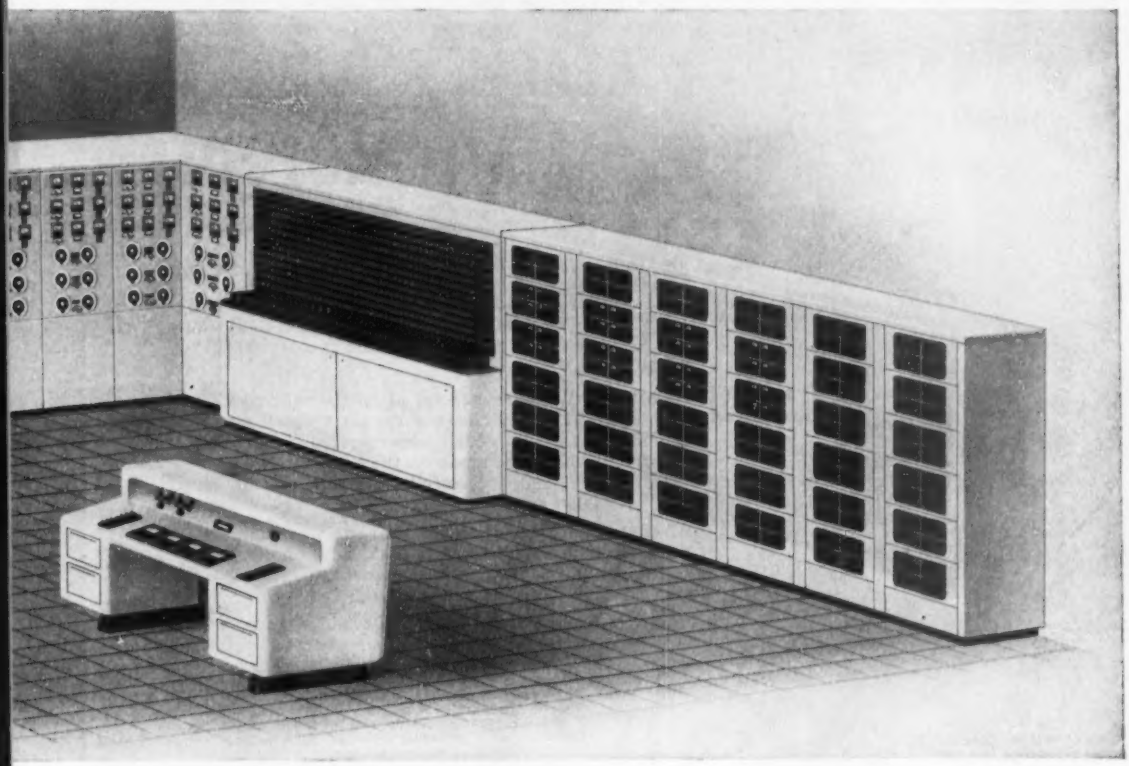
I-T-E continues to support America's greatest electrical expansion

KWHR capacity has doubled in the last ten years. Present trends indicate another doubling in the decade to come. More effective equipment for system planning, as well as new power-generation, transmission, and distribution equipment, will be required to handle this vastly increasing capacity.

Recognizing the need for more effective planning equipment, the I-T-E Circuit Breaker Company is making available a complete line of power system analyzers, designed for utmost accuracy and speed of operation. These analyzers provide solutions to system problems resulting from rapid growth and interconnections, and afford studies otherwise too difficult because of limited technical manpower and time. These units incorporate features covered by the patents and latest designs of Professor E. B. Phillips, University of Kansas.

I-T-E thus continues to support industry by providing more products, broader lines, and increased production of the finest-quality equipment.

# of POWER SYSTEM ANALYZERS



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QUALITY CUTOUTS PAY OFF IN LOWER MAINTENANCE

Actual Field Tests of KEARNEY H-D TRIP-O-MATIC CUTOUTS

**Taken at random from the regular production line.*

Demonstrate High Short Circuit Interrupting Capacity

TEST: Two standard, 100 ampere, 5 KV TRIP-O-MATICS* (indicating 12143-20 and non-indicating 12143-21) were subjected to faults on the 5 KV side of a 10,000 KVA transformer.

RESULTS: At 5 KV with a power factor of 20%, the Heavy Duty Trip-O-Matic Cutout successfully interrupted nine shots, ranging from 5500 to 6350 amperes, RMS. Three additional tests were made on the same box with a new door installed, successfully interrupting 5800, 5750 and 6050 amperes.

After the short circuit test, a heat run was made on the same non-indicating box. Maximum temperature rise was found to be 21°C, as compared to the 30°C allowed by NEMA on new cutouts.

These test results are proof-positive that Kearney cutouts protect your circuits with *even greater* short circuit interrupting capacity than their nameplate ratings.

NOTE: These reports are NOT BASED ON CALCULATION! They are the results of actual field tests at Kearney's 34.5 KV substation. Power was taken from the Union Electric circuit providing a 445,000 KVA backup.

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For Better Construction ... For Safer Maintenance

For the atom-age farmer's daughter electricity makes things easy, be she milking . . .

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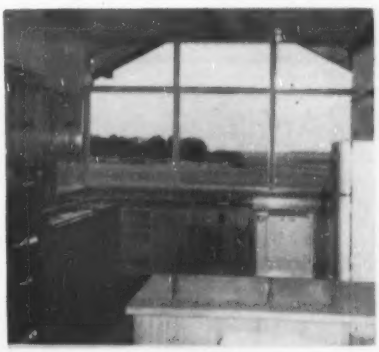


Now You're Gonna Keep 'Em Down on the Farm— After They've Seen PG&E

Story continues on page 16

On California's farms, electricity . . . helps farmers irrigate their land . . .

Story starts on page 15

● Power has put farming on an industrial footing in California's Central Valley. Outfit taking the credit is Pacific Gas & Electric Co. On the 80,000 farms in the company's service area power consumption hit a new high of 42,931 kwhr per customer last year—a 21% increase over average use for the year before.

In the Valley high consumption of electricity and farm gross income have gone hand-in-hand. Last year the average figure was $20,000 compared with a national average of $6,500. PG&E men say two factors are responsible—irrigation pumping and the constant promotion of farm electrification by PG&E.

Started With Pumps . . . Rural electrification began in California in 1898 with the building of an extension to some 20 pumping plants to irrigate orange groves near Porterville. By 1924 irrigation pumping had become so important that PG&E instituted a free pump-testing program. Under this program measurements are made of rate of flow, total lift and power input to determine plant efficiency. The service provides specific information on condition of pumps so that dealers and service men may determine need for repairs or replacement. By-product of the testing program has been the gathering of hydrographic information from which a continuous record of ground water levels in pumping areas is maintained.

At present, nine two-man crews work full time testing the 64,000 irrigation pumps in the territory. During 1953, 7,529 tests were made to bring grand total since 1924 to 105,137.

Importance of electric pumping in irrigation may be shown readily. Of all the water used in the valley, 70% is pumped electrically with a good portion being lifted from wells.

Agriculture authorities have estimated that the greater portion of irrigation water will continue to come from the farm customer's own well, lifted by pumps. While the need for irrigation pumping has given impetus to line extensions, the liberal extension policy fostered by PG&E has further speeded farm electrification. Following the war, the company adopted a territorial coverage policy on the basis of $15 for construction for every $1 of estimated initial annual revenue. Under this policy, 16,000 miles of three-phase line were built in 1947.

At this time the policy was revised and based on feet of extension per load to be connected. Under this plan, 1,300 ft of line will be built free for a range of 6 kw or more, 600 ft for each 30-gal or larger automatic storage-type water heater, 400 ft for each lighting customer, and between 50 and 250 ft for other types of load. For other than domestic service, 200 ft will be built free for each kw of lighting, 200 ft per motor hp for the first 5 hp or less, and 250 ft per hp for all loads above 5 hp. For extensions beyond the free allowance, customers pay the company $0.60 per ft. Payment is refunded to customers over subsequent bills.

Territory coverage of 98.5% in PG&E's service area illustrates the results of the extension program.

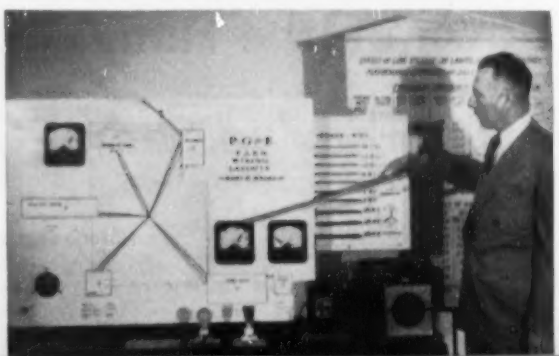
Rates Must Be Reasonable . . . But availability of power is only the beginning, PG&E farm men believe. The customer must be attracted by reasonable rates and the knowledge of how to put the power to work. To promote a healthy and steadily increasing farm output by greater use of power, PG&E's rural rate schedule provides for electric energy at rates which have

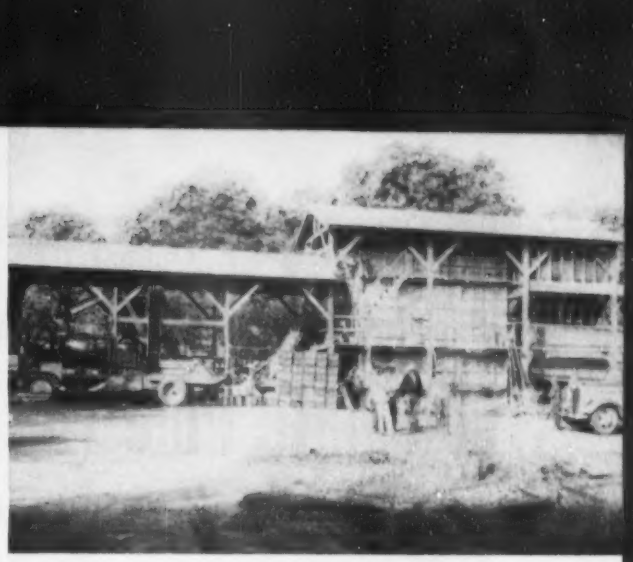
3 'Ag' Services of PG&E:

LEFT: Adequate farm wiring demonstrations are in great demand from farm groups.

CENTER: Company sets up electrical projects with 4-H and other farm youth groups.

RIGHT: A major feature of PG&E's farm electrification program is its free pump testing service.





provides light to spur feeding . . . **supplies power to hull and dry walnuts**

been among the lowest for farm service in the country. In 1953, the average farm power rate was 1.26¢ per kwhr based on total power sales of 2,903 million kwhr. The average farm domestic (single-phase) rate was 1.89¢ per kwhr on a total usage of 540 million kwhr. Average combined rate was 1.36¢ per kwhr for an average consumption of 42,931 kwhr per farm.

To put electricity to work, the company offers seven distinct types of service programs to the farm customer. Primary aim of the combination is to show the farm customer how to obtain the best piece of equipment for the application and how to use it efficiently.

Agricultural engineering service offered by the company points up the efficient use of electricity to farmers. The company has prepared demonstration equipment and lectures to explain correct farmstead wiring practices to group meetings. Customer demand for the demonstrations is so great that one is presented almost every working day of the year. As part of this program, PG&E holds meetings to show the need for three-element protection on three-phase equipment. Demonstration equipment shows the result of inadequate protection in the event of failure of one phase of the supply.

Works With Ag Committee . . . PG&E has continued to work closely with the California Committee on Relationship of Electricity to Agriculture since its inception in 1927. Most of the advanced experimental work in power uses on the farm during the past two decades has come from the committee. The company has provided annual grants during the past 25 years to continue this work.

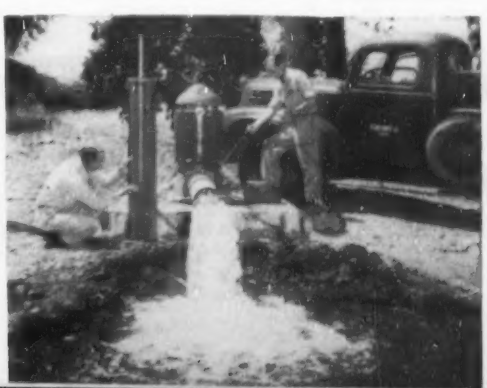
The committee includes representatives from utilities, electrical equipment manufacturers, farm organizations, University of California's College of Agriculture, and the Public Utility Commission. Two full-time researchers work constantly to develop new economic uses of electricity. The approach is from the point of view of how the farmer will be able to save time, money or labor.

Exceptional growth in the livestock industry is just one example of what this electrical promotion has done for California's agriculture. In 1952 more than 1 million head of beef cattle were fattened in California feed lots. Most of the the remaining 650,000 head were fattened on permanently irrigated pasture totaling about 700,000 acres. Electric power is used in the highly mechanized mixing and handling of feed. About 315 kwhr of energy are required in the process of raising and finishing a 1,000-lb steer.

Within the PG&E's service area of 89,000 sq mi there are more than 80,000 farms ranging in size from less than 10 acres—30% of all farms —to 50,000 acres.

That farming has assumed an industrial basis in the Valley is indicated by these statistics: In 1953 there were 1.5 million hp of connected 3-phase motors that consumed about 2.9 billion kwhr, of which 20% was for non-irrigation uses. Annual increase in consumption on the farm is twice the rate of growth for the company as a whole.

In Pacific G&E territory, electrical milkers, hay dryers, feed conveyors and dozens of other farm machines are building load year after year. Building farm income, too. That's the big factor which has convinced California farmers to join the electric-powered industrialists.



CHANCE WN-VN SWITCHES

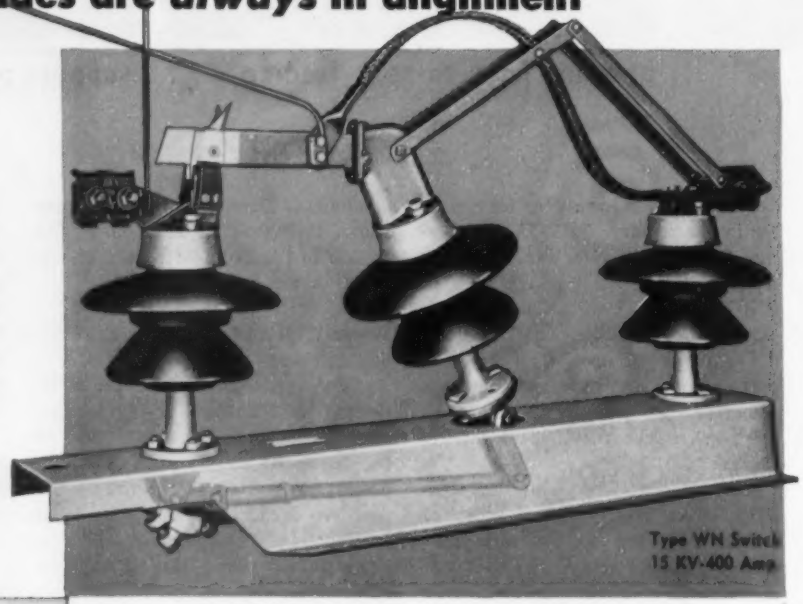
Eliminate Pole Top Switch Adjustments...

WN-VN blades are *always* in alignment

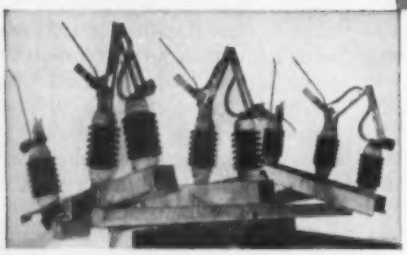
Forget maintenance problems on pole top switches. Chance WN-VN Switches *can't* get out of line!

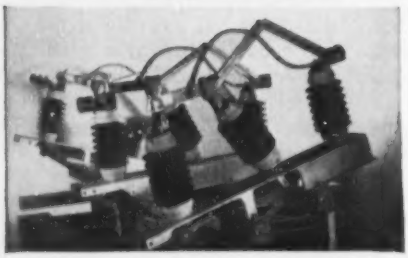
Why? Because these pole top switches have the Chance Compensator Control that keeps the operating force in line with the blade motion. An extra wide tilting insulator mounting gives solid support that eliminates side-play. Bases are deep drawn and flanged —they won't cut into the wood supports and loosen the bolts— they resist twisting and side distortion.

Phantom view shows the exclusive shielded Compensator Control Mechanism that gives extra leverage —offsets structural distortion—prevents insulator shock from "slamins"—simplifies installation.



Type WN Switch
15 KV-400 Amp





make positive contact under all conditions

You get top performance under all conditions with Chance WN-VN Gang Operated Switches. Switch blades *always* seat regardless of warping, twisting, settling or bowing of the supporting structure. The photographs at left show how the dead toggle on each base permits every blade in a three pole switch to make complete contact in spite of extreme distortion. No special adjustments were necessary to compensate for the distortion on this "torture rack" test.

* * *

Chance pole top switches are easy to install because the interphase shaft is simply lifted and clamped into position—you can even mount them below the pole top without shifting these switches off balance.

For conditions of extreme corrosion, a special protective Neoprene coating for the flexible braid is available at slight additional cost.

You know it's RIGHT when you specify CHANCE

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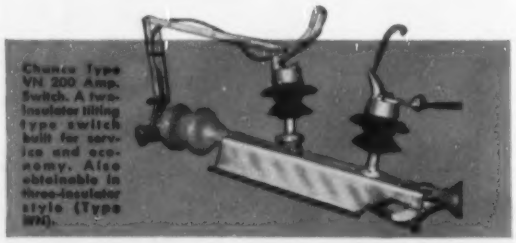


Chance Type VN 200 Amp. Switch. A two-insulator tilting type switch built for service and economy. Also obtainable in three-insulator style (Type WN).

Moses Testifies . . .

. . . at Niagara hearings. New York Power Authority chairman advocates letting FPC decide power development issue

Political interest generated by the controversy over public versus private development of additional power at Niagara Falls was emphasized March 31 with the appearance of Robert Moses before the Senate Public Works Committee. The newly appointed chairman of the New York State Power Authority drew a full-capacity crowd in Washington.

Moses urged that additional Niagara hydroelectric facilities be constructed and operated by the State of New York.

ROBERT MOSES, New York Power Authority head, urges passage of Case bill at Niagara hearing

Plugs for Case Bill . . . Probably more committee members, reporters, and the public were present than at any other of the current Niagara hearings heard Moses attack the Miller-Capehart bill, and plug for adoption of the Case bill—which would let Federal Power Commission decide who is going to build further power developments at the falls.

The Miller-Capehart bill, which has been voted by the House, would direct FPC to grant the necessary license to five private New York utilities, led by the Niagara Mohawk Power Corp. Proponents of this bill have argued that the only factor involved is the generation of power, that this is the business of the private utilities who are already near that area, and that further development under the Miller-Capehart bill is an extension of this business.

Moses took immediate issue with this argument, and said it overlooks the real issue, which in his words is "the public ownership and inalienability of a natural resource of the State of New York."

Threat to Utilities Denied . . . Outlining the proposals of his state agency for Niagara development, Moses said it contains no threat, open or hidden, to honest private utilities nor would it weaken private enterprise. At the same time, he argued it is the only plan that fully protects the state's interest in the preservation of its greatest natural resources and their conservation.

He said the New York plan would provide fair, practical and reasonable contracts with the private utility companies for sale of power at the source to them, for pooling and expanded distribution to consumers at reasonable rates. And the contracts will also provide for the distribution, by agreement, of power to other states in the surrounding areas.

Warns of Fight . . . Moses termed the Miller-Capehart measure a "grab bill" and warned New York State would fight it all the way to the Supreme Court if the Senate passes and the President signs it. Citing the recent decision by the Supreme Court in the Niagara Mohawk Power Corp case—that water use rights are subject to paramount state control—Moses said the notion that these five utilities "can walk away with Niagara is just moonshine."

Asked why he preferred the Case bill to one introduced by Sen Irving S. Ives (R-N. Y.), which specifically would direct FPC to license the state authority, Moses said it was a matter of principle. He said he preferred to take his chances that FPC would support the state authority plan on its merits.

Several senators, including the committee Chairman Edward Martin (R-Pa.) and Prescott Bush (R-Conn.), questioned Moses closely about the matter of where New York opinion really stood on the public versus private development issue. After Moses stated that if the people there could vote on it, less than 10% would support the utilities, Senator Bush noted that of 188 New York newspapers, only four supported state development editorially.

Moses rejoined: "Would you weigh the opinion of my weekly paper in the village of Babylon, with 3,000 population, with that of the 'New York Times?' "

Bush and Martin also referred to statements and resolution on behalf of county supervisors, various unions, and farm groups which expressed approval of the private development plans.

Calls Fight One-Sided . . . Moses replied: "I'm not impressed at all. It's been a one-sided argument. If you want this thing decided on the basis of public opinion polls we'll fight it that way."

Expressing the belief that some of the polls had been taken in dubious ways, Moses said "people have been subjected to pressures the like of which I haven't seen in many years. I don't like gutter fighting, but I can do it if I have to—I got my training in water polo."

3-Way Partnership Proposal . . .

. . . for development of John Day site being considered, PGE reveals. Public, private utilities, government would furnish aid

Portland General Electric Co's investigations of the prospects for "partnership" development of the John Day site on the main stem of the Columbia River embraces financial help of other utilities, private and public, in a formula that would give them 50-year rights to energy output of the dam and powerhouse.

Board Chairman Thomas W. Delzell, who recently visited Washington, D. C., and conferred with Interior officials, reports Oregon "REA's and PUD's" have expressed encouraging interest. Attending the press conference called by Delzell was Paul B. McKee, president of Pacific Power & Light Co, who emphasized the entire proposal is in "the extreme exploration stages."

Delzell said one way the partnership development of John Day might work entailed the various public and private utilities advancing $164 million toward the $320 million cost of the dam, which would be built by the Army Corps of Engineers. About $36 million would be non-reimbursable federal contribution for navigation benefits and the remaining $120 million would be paid back to the U. S. Treasury with interest over a 50-year period.

Low Cost Power . . . U. S. would build, own, and operate the dam as a unit of the Columbia River system and, Delzell said, presumably the power would be "low cost power" comparable with cost of energy at whatever Bonneville rates might be in 1960 or 1961, when the dam could be completed.

John Day has been authorized by Congress but no funds have been appropriated. The site is 28 miles upstream from the Dalles project and below McNary. It is the last of the major main stem projects bordering Oregon and, under Corps of Engineer proposals, would have installed capacity of 1,105,000 kw.

No Commitments Yet . . . In disclosing the investigations Delzell declared:

"We are encouraged by the apparent attitude of the various public agencies. The same goes for the private utilities we have approached.

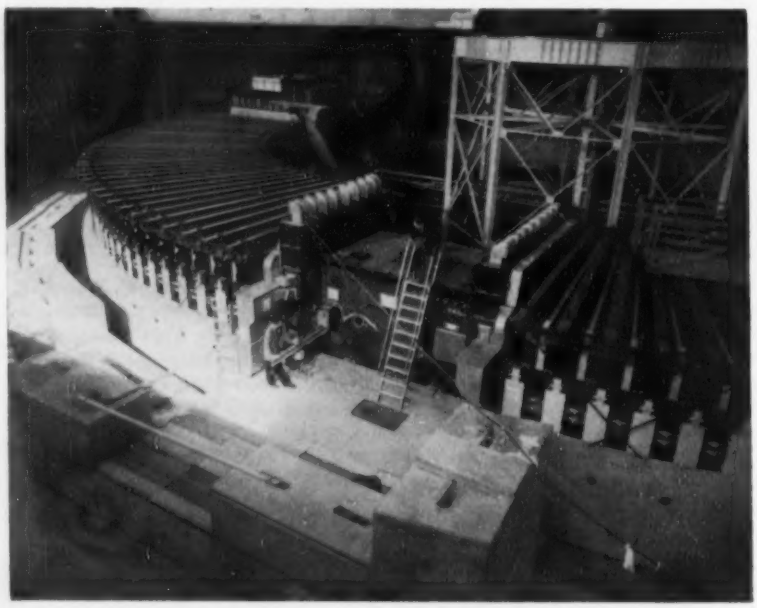
"But we have no commitments from either side."

In another proposal, Pacific Power & Light Co and Mountain States Power Co have offered to finance power facilities for Green Peter Dam on the Santiam River in western Oregon if Congress will implement the flood control project authorization to embrace the Eisenhower plan of partnership development.

Cost of main structure and a reregulating dam with power facilities is estimated at $58.3 million. If power phases were authorized the structures and reservoirs would provide 96,000 kw. Powerplant at Green Peter Dam would have two units of 40,500 kw each and operate on a 40% load factor, necessitating reregulation facilities. The reregulating dam would be at White Bridge, 3 miles downstream.

Congress has been asked to authorize the inclusion of power features at the Santiam River project and also at the proposed Cougar project on the McKenzie River. The flood control subcommittee is prepared to recommend the additional authorization to the full House Public Works Committee either as a part of the omnibus flood control bill or as a separate measure.

Additional legislation still would be necessary to permit Pacific P&L and Mountain States Power to participate in the Santiam River project and Eugene (Ore.) Water and Electric Board to develop 25,000 kw of power at the Cougar project.

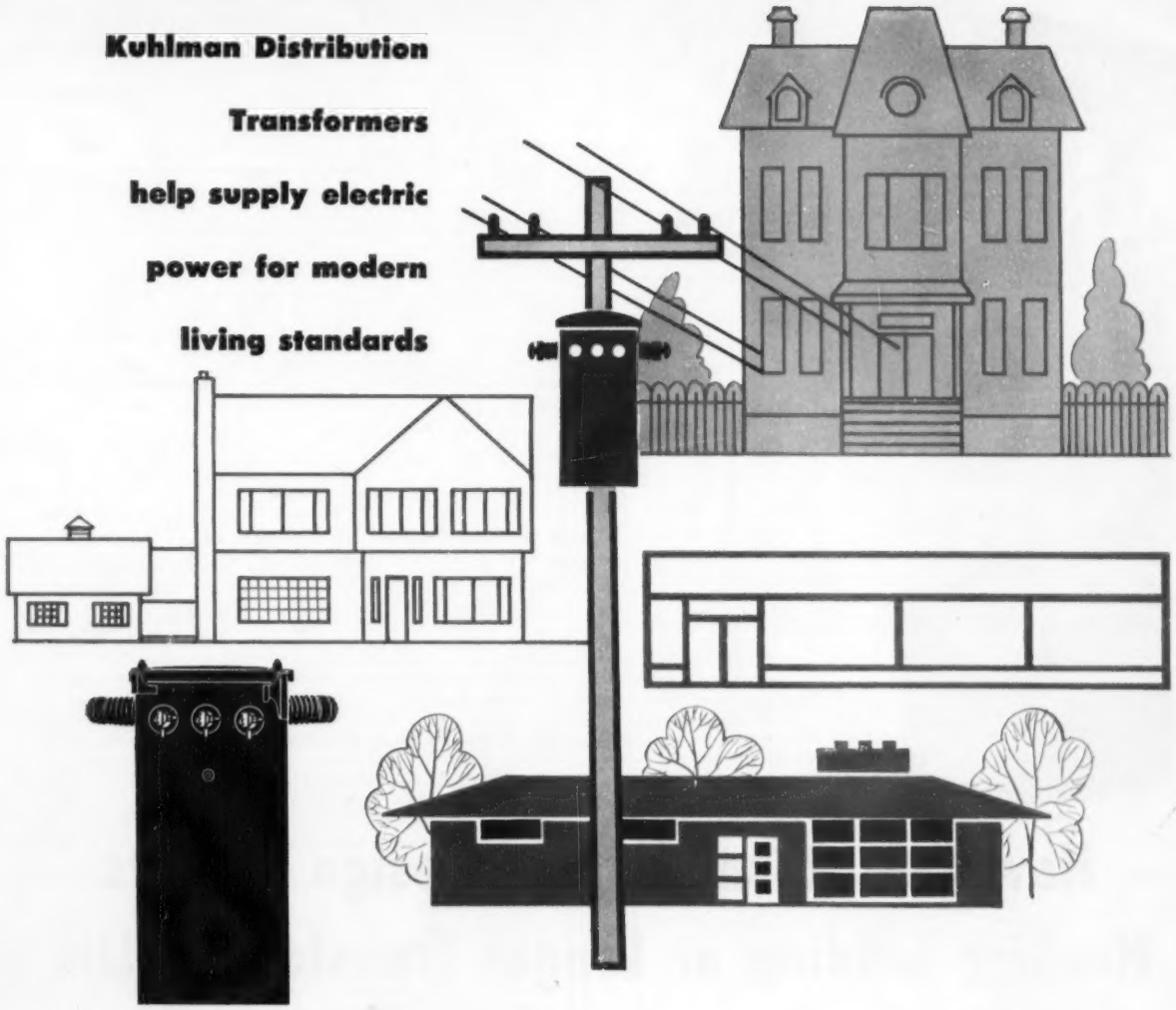


World's Most Powerful Atom Smasher

World's most powerful atom smasher was placed in operation last month by the University of California at its Radiation Laboratory, Berkeley, Calif. In its initial operations, the bevatron (pictured above) succeeded in producing five billion electron volts. When brought to full power, the device will produce 6,250,000,000 electron volts. This is more than twice the energy of its nearest rival, the cosmotron at the Atomic Energy Commission's Brookhaven National Laboratory, Upton, N. Y. It was built by the California university for AEC at a cost of $9 million.

Technicians are pictured at the target area of the circular instrument.

Kuhlman Distribution Transformers help supply electric power for modern living standards



Kuhlman Distribution Transformers, specifically engineered for dependable, low-cost service, help utilities provide a steady and reliable source of power to American homes. Under operating conditions of varying loads these units give exceptionally good voltage regulation. The bent iron core construction permits full utilization of the best qualities of transformer steel and requires very little reactive power from a distribution system.

Insulation of Kuhlman Transformers is coordinated with the basic impulse level. Wide oil ducts insure ample cooling. Construction throughout is sturdy and rigid. Careful finishing of the sealed copper bearing steel tanks insures long service under the most difficult weather conditions.

Kuhlman Distribution Transformers are built by highly experienced electrical technicians, many of whom have been on the job at Kuhlman for fifteen to twenty years. Kuhlman Distribution Transformers are produced in single and three phase ratings from 3 to 500 KVA. For complete information, write for Bulletins CS 201, CS 202, and CS 203. Kuhlman also manufactures Power, Dry Type, Saf-T-Kuhl, CSP, Subway and Series Street Lighting Transformers. Write for bulletins on these types as well.

152-M

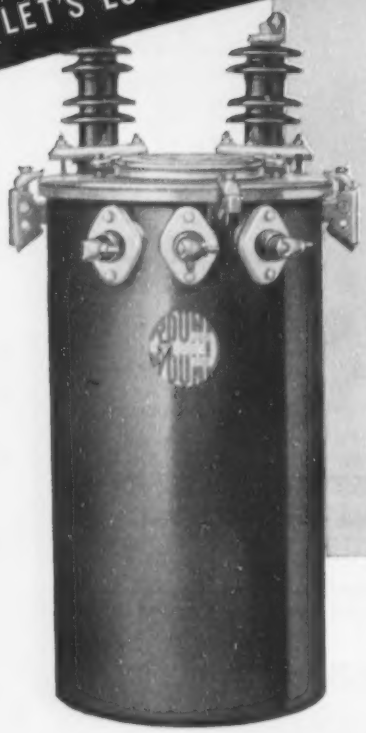
KUHLMAN

KUHLMAN ELECTRIC COMPANY, BAY CITY, MICHIGAN • Southern Division, CRYSTAL SPRINGS, MISSISSIPPI

EXPORT REPRESENTATIVE: INTERNATIONAL STANDARD ELECTRIC CORP., 15TH FLOOR, 50 CHURCH STREET, N. Y. 7, N. Y. CABLE ADDRESS: MICROPHONE, N. Y.

SIXTY YEARS OF PROGRESS IN THE ELECTRICAL INDUSTRY

LET'S LOOK AT THE FACTS



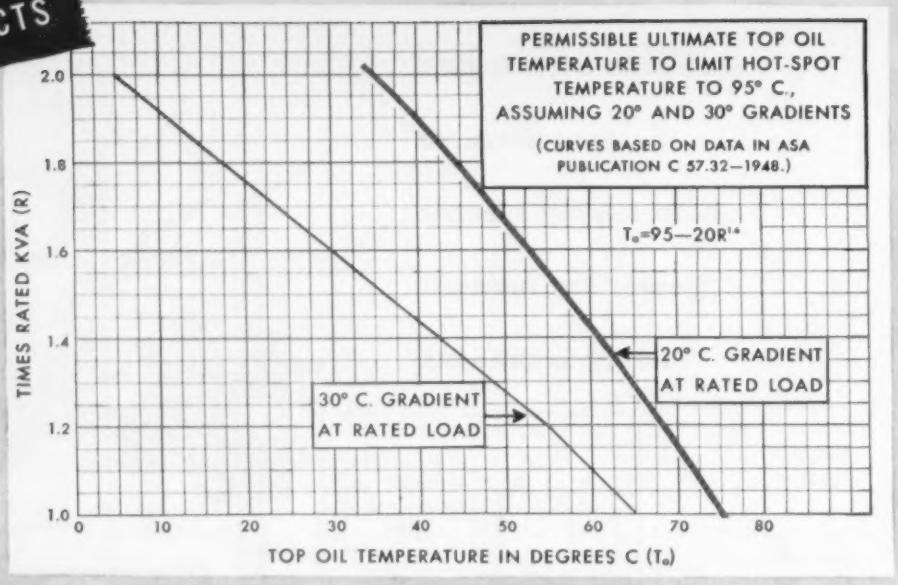


FIGURE 1—The colored line represents the conservative performance typical of a core-type transformer with highly efficient cooling such as the L-M Round-Wound, while the black curve represents the loading permissible with a transformer with less efficient cooling. These are ultimate oil temperatures. Because of efficient dissipation of heat from the coils to the oil, the oil reaches its ultimate temperature more rapidly in L-M Round-Wounds than in some other styles of construction.

How L-M Round-Wound Design Permits Heavier Loading or Longer Transformer Life

Round coils wound directly onto a wound core provide exceptional cooling that keeps copper and hot-spot temperatures relatively low even under high short-time overloads.

by **ROBERT P. THOMPSON,**
Assistant Chief Engineer,
Transformer Division,
Line Material Company

Greater transformer utilization through heavier loading offers substantial savings on almost any power system. Therefore the subject of transformer loading is receiving exceptional attention, both from utility companies and from the manufacturers.

Overload capacity of any individual transformer depends upon such factors as ambient temperatures, previous condition of loading, duration of the overload, and the sacrifice in transformer life that the user is willing to make.

But the principal factor is the transformer itself. Since overload capacity is limited by hot-spot temperature rise during the overload period, this capacity is largely determined by the design of the coils and the efficiency with which heat can be dissipated to the oil.

Obviously a core-type transformer, which has greater coil surface exposure, offers better overload capacity than shell types, in which coil surfaces are blanketed by core steel.

Round coils offer greater overload capacity than rectangular coil types, because coils present more unobstructed surface to cooling oil.

The Round-Wound transformer combines the advantages of the core-type transformer with the rapid heat dissipation of unobstructed round coil surfaces—and offers, in addition, the advantages of the cruciform-cross-section core, which provides natural oil passages for cooling the inside of the coils. Thus in the Round-Wound transformer, heat is dissipated *more rapidly* and more uniformly. For this reason the Round-Wound design provides higher short-time overload capacity, or a longer life with the same overload (Figure 3).

Get Details on L-M Round-Wound Transformers

Ask the L-M Field Engineer, or write Mr. Thompson at the Transformer Division, Line Material Company, Zanesville, Ohio (a McGraw Electric Company Division).

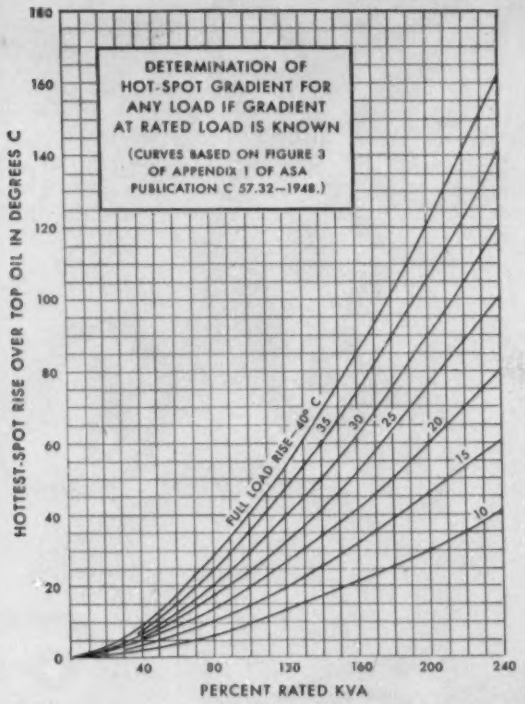


FIGURE 2—Here is presented a method of determining the hot-spot gradient for any load, if the gradient at rated load is known. It is to be noted that the higher the gradient at rated load, the more rapid is the rate of increase in the gradient with overload. The L-M Round-Wound transformer with a lower hot-spot gradient at rated load has a greater capacity for overload before damaging temperatures are reached.

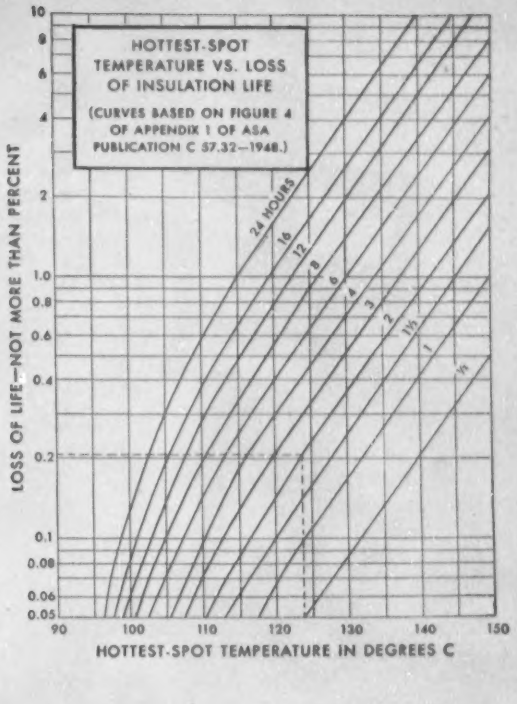


FIGURE 3—The primary factors in the deterioration of cellulosic insulation are time and temperature. Here is a method for approximating the loss of insulation life due to these two factors. Obviously an L-M Round-Wound transformer with its appreciably lower hot-spot temperatures during overloads will reduce the possible insulation damage and increase the overall life.

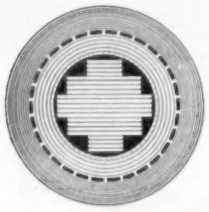


FIGURE 5—Cruciform cross section of the wound core provides oil passages between core and coils. In addition spacers between windings and between layers in larger sizes provide additional oil circulation, giving exceptionally good cooling for the entire unit.

Some of the Outstanding Characteristics of L-M Round-Wound Transformers

High Short-Time Overload Capacity

Better Regulation at all power factors

High Impulse Level, with ample creepage distances and generous insulation

High Short-Circuit Strength, because round coils have less tendency to distort

Low Exciting Current, because the core is not cut or disturbed after annealing

Better Loss Ratios with lower total losses

Filled with ORTO®, L-M's oxidation-resistant transformer oil, inhibited for longer life.

89

"Round-Wound" is a Line Material Co. trademark.

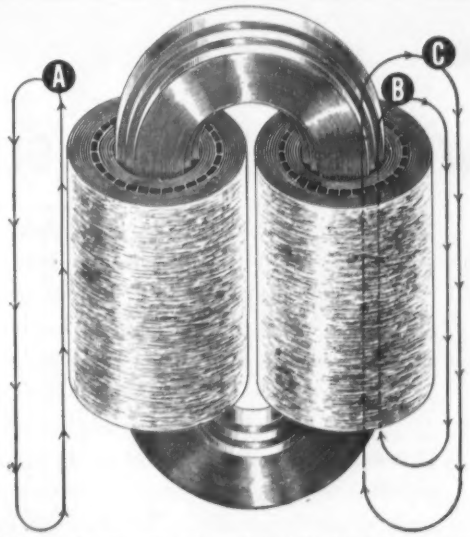
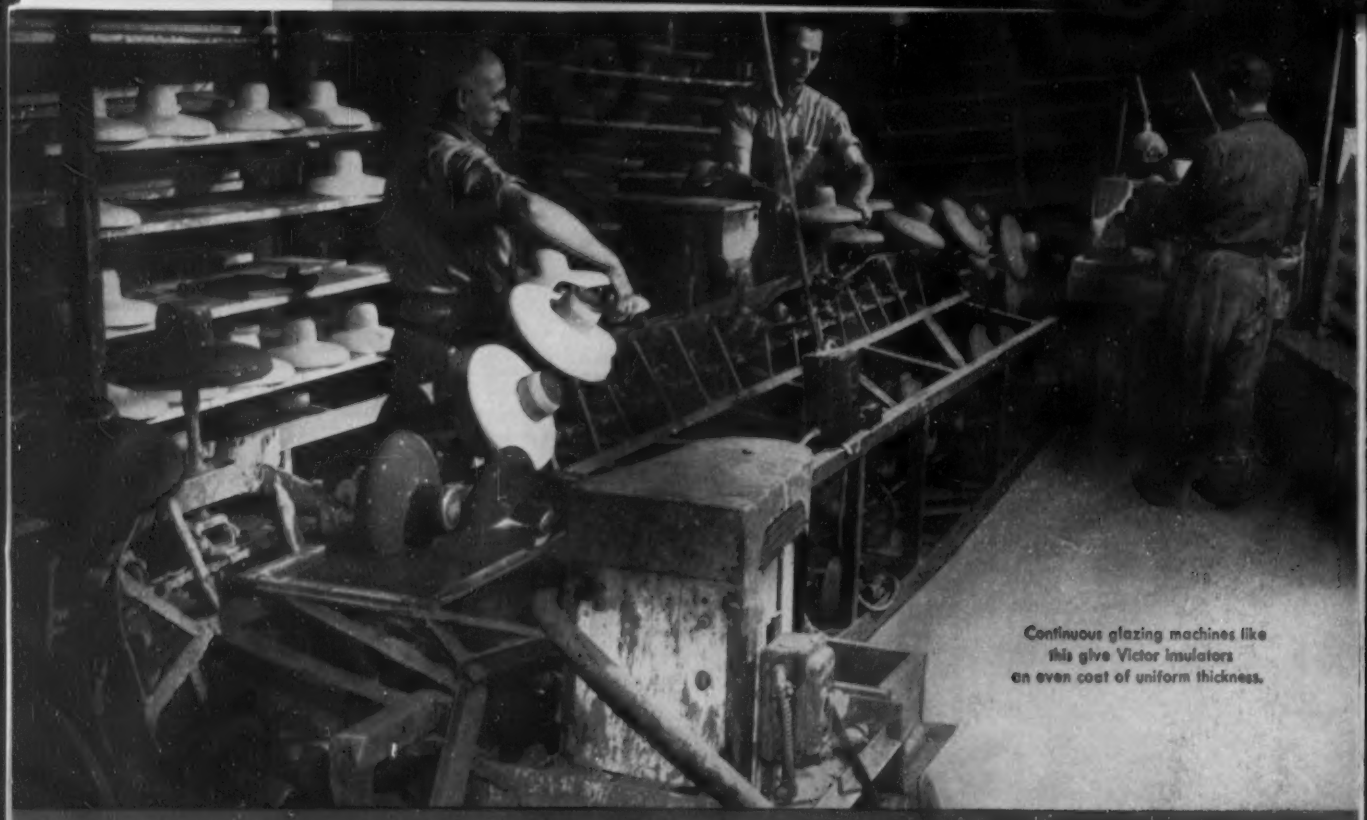


FIGURE 4—Diagrammatic presentation of the Round-Wound core-coil assembly. The core is wound of continuous strip of oriented silicon steel of various widths to give a core of cruciform cross section. Core is not unwound or cut, because coils are wound directly onto the completed, annealed core. Coils surround a maximum of the core circuit. They present a relatively large area to cooling oil.

LINE MATERIAL Transformers

Complete Coordinated Equipment for Distribution Today



Continuous glazing machines like this give Victor insulators an even coat of uniform thickness.

Another Reason Why—

VICTOR Makes Better Insulators

WE USE AUTOMATIC GLAZING MACHINES

PERFECTION of glaze makes an insulator self-cleaning, gives it higher mechanical strength and greater resistance to thermal variations.

By designing and building its own automatic machines, Victor gives you this glazing perfection. Each insulator is thoroughly and evenly coated with glaze. Timing is accurately controlled for maximum penetration at the interface of the insulator body and the glaze.

That's why Victor gives you smooth, perfectly glazed insulators that stand up under the most severe conditions of service . . . that cut maintenance and replacement costs to a minimum. For the full story, send for our free booklet, "The Story of Victor and Purified Porcelain."

VICTOR NO. 900 SUSPENSION INSULATOR

Specify

VICTOR PURIFIED PORCELAIN INSULATORS

VICTOR INSULATORS, INC., VICTOR, N. Y.

Low and High Voltage Pintypes • Suspensions • Guy Strains • Spools • Switch and Bus Insulators • Custom Designed Porcelain • Insulator Hardware

For Penelec's Shawville Plant at Load Center in Coal Area . . .

Tower Cools Scant River Flow

W. C. SONTUM, Vice-President and
B. F. BORGEL, Mechanical Engineer,
Pennsylvania Electric Co, Johnstown, Pa.

Scanty dry-season flow of the West Branch of the Susquehanna River forced Pennsylvania Electric Co to erect a large cooling tower at Shawville generating station. This tower (extreme left in photo above) enabled the plant to be located in the bituminous coal fields near the center of system load. Commercial operation is scheduled this month.

Many Noteworthy Features . . . Loading plans for this $40-million, 250-Mw station dictated many design improvements for efficiency and availability. Noteworthy features are:

1. Initial design and construction of two identical units. Future plans call for four units with a total capacity of over 500 Mw.

2. Connection to two transmission systems to serve load 100 miles distant.

3. Pressurized boiler casings with conventional draft equipment.

4. Single-bed demineralization for make-up water.

5. Centralized control and relay room.

Fuel will come via truck and rail from strip and deep mines within a 10 to 15-mile radius of the station. The short haul eliminates need to thaw frozen cars. Unloading facilities capable of 1,200 tons per hour from either trucks or cars will handle the ultimate four units contemplated. But a second coal handling system and breaker will be required later.

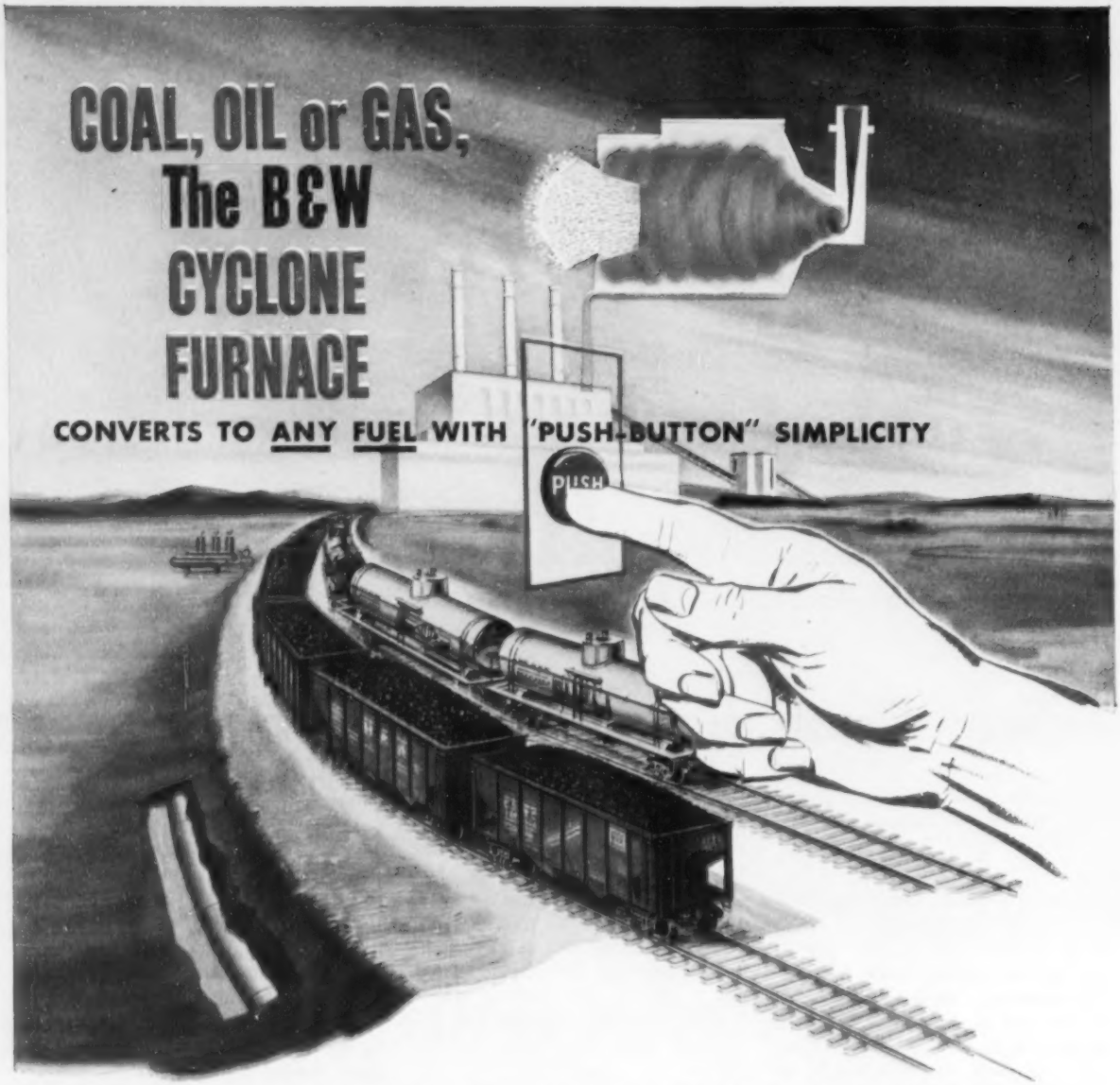
Power plant sites rarely provide ample fuel and cooling water conveniently near the load. And Shawville is no exception. Building the station here required special provisions for cooling water and high-voltage transmission to load areas.

Condenser water comes from the West Branch Susquehanna River which drains 963 sq mile of mountainous terrain. Flow varies from 25,000 gpm to maximum flood of 13,500,000 gpm. During dry periods river water supply is supplemented by an induced-draft cooling tower capable of dropping 52,500 gpm from 115 to 85 F with a wet bulb reading of 75 F. This tower will permit 137.5-Mw generation from each turbine at 3.5 in. Hg with minimum river flow.

River acidity reaches a *ph* of 3.0 from mine drainage; so piping must be corrosion resistant. The condensing system uses cast iron pipe coated with bitumastic compounds, bronze, and superloy tubes. Water for house service and makeup passes through a 168-gpm reactivator, guaranteed to reduce 5,000 ppm turbidity to 5 ppm, thence to two gravity filters. Makeup water is further treated in two 68-gpm mixed-bed demineralizers guaranteed to maintain 0.25 mhos per cu cm with not over 0.05 ppm of silica. This

Characteristics

Normal function: Base load
Initial operation, 2 units: 1954
Total gen. rating (nameplate): 250 Mw
Station capability: 275 Mw
No. of boilers: 2—920 M lb per hr
Steam: 1,800 psi, 1,050 F, reheat to 1,000 F
Cooling water range: to 85 F
Corresponding vacuum: to 3.5 in. Hg
Station service generators: 7.5 Mw, 4,160 v on main shaft
Start-up power: 115/34.5/4.16-kv 37.5-Mva, FOA, 3-ph transformer
Excitation, main and station service units: electronic from 4,160-v bus
Plant site area (acres): 60
Employees: total 67, operation 30
Employees per 1,000 kw per day: 0.24



"Fuel bargains" are always being sought by alert operators of industrial and utility power plants so they can produce power as cheaply as possible.

Although their boilers may be designed basically for a specific fuel, quick conversion of firing equipment from one fuel to another is also an essential factor in taking full advantage of fuel availability. Otherwise, costly, time-consuming changes may eliminate the expected economic gain, or may be a disadvantage in an emergency.

If it is important in your power plant operations to be able to take instant advantage of availability of different fuels, the Cyclone Furnace will be of special interest to you. Originally designed to make it possible for power men to burn coal more easily and with greater efficiency, the Cyclone Furnace has also proved to be an excellent means of burning oil and gas. And the change-over from one fuel to another is made with "push-button" simplicity.

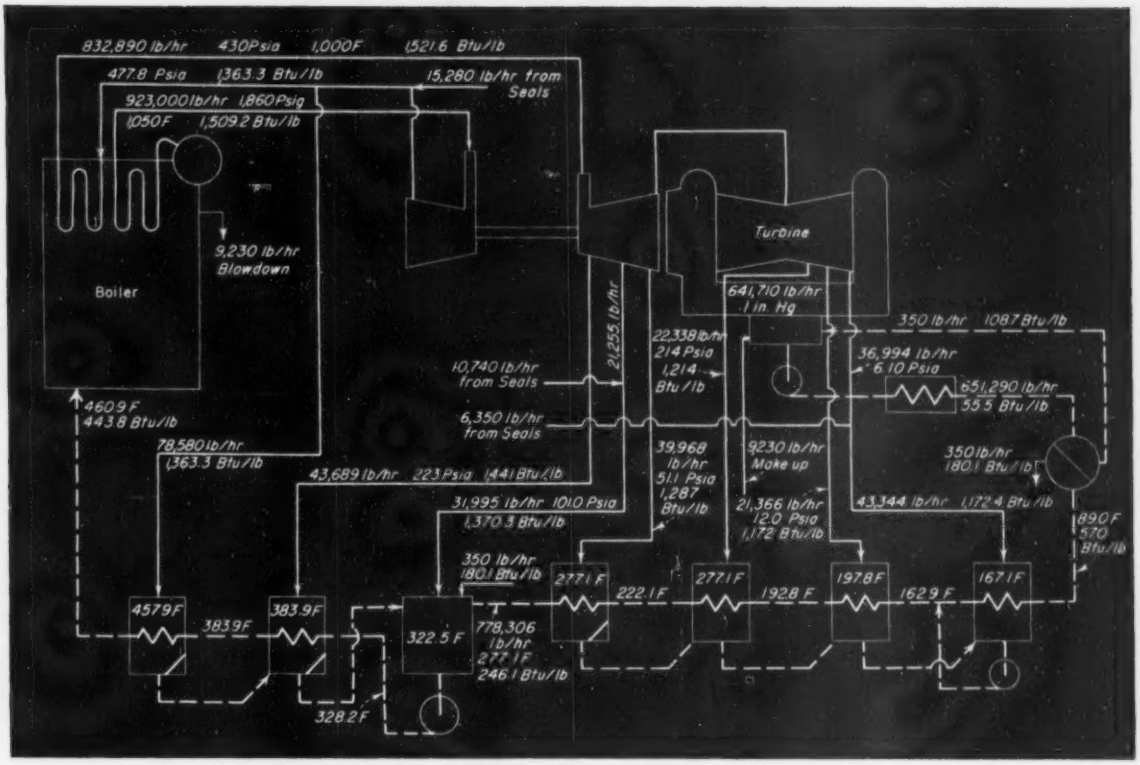
So . . . whether your initial fuel for steam generation is to be coal, with the thought of future conversion to oil or gas . . . or whether you want to start out equipped to burn all three fuels, when any one is economically available, the Cyclone Furnace can do your job with less equipment, less building volume, and less labor than is possible with other systems of firing.

Fuel flexibility is only one of the many reasons why the Cyclone Furnace is being used to fire some of the world's largest and most efficient boilers. We will be happy to discuss its many other features that may have direct benefit for you. The Babcock & Wilcox Company, Boiler Division, 161 E. 42nd Street, New York 17, N. Y.

BABCOCK & WILCOX

BOILER DIVISION

N-169



7 Extraction Stages with Reheat Achieve 9,250 Btu/kwhr

water is stored in tanks with a total capacity of 80,000 gal.

New 230-Kv Transmission . . . Output feeds two existing 115-kv transmission lines between Philipsburg and Du Bois. And a new 230-kv line has been built to the new Lewistown Substation, thence eastward to an interconnection with Metropolitan Edison Co. (EW, Nov. 24, 1952, p. 6)

Each of two identical turbo-generators is rated 125 Mw at 30 psi hydrogen and 0.80 pf. Connection to the 115-kv system is by 65-Mva, FOA, 3-phase transformers. And another pair of 115-Mva, FOA, 3-winding, 3-phase transformers connects to the 115 or 230-kv systems, or to both. Any transformer can be isolated with bolted disconnect links when its generator is out of service.

Turbines are tandem compound, triple exhaust, rated 100/125 Mw, maximum capability 143 Mw. Triple flow was justified over the more conventional double flow primarily on economy and capacity basis. Heat cycle operates at 1,800 psi, 1,050 F reheat to 1,000 F, with seven stages of feedwater heating. Expected station heat rate with makeup is approximately 9,250 Btu/net kwhr.

Boilers Pressurized . . . Boilers are dry bottom, radiant type with 16 burners served by four pulverizers, for bituminous firing only. Pressure-type casings are expected to boost boiler efficiency approximately 0.5% by decreasing air leakage. All components of the boilers are arranged for pressure operation. The induced-draft fans can be eliminated if it becomes desirable. Nominal steam flow is 920,000 lb per hour with the temperature controlled by flue gas recirculation supplemented in emergency by spray attemperation.

Ashes will be sluiced to two retaining ponds. Flyash and dust will be collected by electrostatic precipitators of 95% collection efficiency and sluiced to the same ponds. Alternately these ponds will be dewatered and the ash may be trucked to adjacent abandoned strip mining excavations.

The control room is enclosed in glass and provides a view of the firing fronts of both boilers and the governor end of both turbines. It includes three benchboards, one electrical control board flanked by two boiler controlboards. A recorder cubicle somewhat removed from this operating area supports all necessary recording instruments as well as the automatic ash handling and soot blowing controls. The latter are accessible to the operator and the fireman stationed on the operating floor nearby.

One Man Can Handle Controls . . . Outstanding feature of the control room is elimination of control air pressures above 100 psi. All pressure and metering are electrically transmitted. Control is designed for one-man operation of the two units.

Relays for generator protection and all other functions, together with combustion control components, are placed in a relay room directly beneath the control room. Relay room and control room are both air conditioned.

Troughs and ducts carry multiple power and control cables at a savings of nearly 50%. And the station enclosure itself uses aluminum panels at half the cost of brick.

DISTRIBUTION TRANSFORMERS
different from others because.....
NEW

....Magne-valve arrester

(gapped valve-type) can be used any place on your system...regardless of short-circuit currents

Small in size and light in weight, the new General Electric Magne-valve arrester has impulse characteristics similar to those of G.E.'s modern pellet arrester—the quality standard of performance in the electrical industry. The new arrester—gapped to the bushing in the same manner as modern pellet arresters on unit-type 2400- and 4800-volt transformers—is now standard on all G-E EEI-NEMA 7200- and 7620-volt unit-type transformers.

NEW ARRESTER FEATURES:

Valve action—Thyrite* valve action is augmented by magnetic action of an internal series gap.

External gap—No 60-cycle voltage across arrester under normal operating conditions—no chance for grounding circuit if arrester is damaged.

Elimination of unnecessary breaker tripping—Unlike expulsion-type arresters, there is no short circuit during discharge and no erosion to limit the useful life of the arrester.

Small size and light weight—9-kv arrester, for 7200-volt transformer, is only 14¼" long, weighs only 10 pounds.

REMEMBER . . . all transformers are not alike . . . compare the General Electric plus features in the chart below and see for yourself.

For more information contact your nearest G-E sales office or agent, or write General Electric Company, Section 431-9, Schenectady 5, New York.

*Reg. trade-mark of General Electric Company

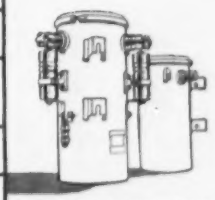
You can put your confidence in—

GENERAL ELECTRIC

ALL TRANSFORMERS ARE NOT ALIKE

(make this simple comparison and see)

FEATURE	General Electric	Mfr. A	Mfr. B	Mfr. C	Mfr. D	Mfr. E
Production-line impulse testing	YES	NO	NO	NO	NO	NO
Nitrile rubber gaskets at all tank openings	YES	NO	NO	NO	NO	NO
Strenicor pressure terminal clamps	YES	NO	NO	NO	NO	NO
One-piece cover band	YES	NO	NO	NO	NO	YES
Terminals designed for both copper and aluminum conductors	YES	NO	NO	NO	NO	NO
Gapped valve-type arresters	YES	NO	NO	NO	NO	NO
Nationwide company-operated service facilities	YES	YES	NO	NO	NO	YES



UNIT-TYPE CONVENTIONAL

"Take your choice G. E. makes both"

Survey shows . . .

Why Stockholders Bought and Kept

Why did shareholders of Citizens Utilities Co buy their stock?

Why do they keep it?

Richard L. Rosenthal, president of the company, wanted the answers to these questions. To get them he sent questionnaires (See box at right) to 1,357 persons holding more than 100 shares. Nearly 24% replied (Box on next page). "This was the first time," Rosenthal said, "that a utility ever asked stockholders their motivations for becoming and remaining stockholders."

In answer to the first question nearly 60% said that they became interested in the company through the advice of "others." Of these, 49% said that a stock broker had advised them to purchase the stock. A "friend" gave the same advice to 28% more. Investment counselors brought in 14½%.

Earnings Prove Attractive . . . In answer to the second question more than 39% gave as their reason the "company's earnings record." Second choice was a tie between the company's stock dividend policy (3% each year) and the advice of a broker, investment counselor, friend, or others. Each of these accounted for nearly 20% of the replies. Of the latter group stock brokers accounted for 51½%.

But all of the reports reflected strong confidence in the management of the company. President Rosenthal was highly praised in many of the returns. And the fact that he is a substantial shareholder brought favorable comments from a number of those replying to the questionnaire.

A Young Company . . . Citizens is a comparatively new company. It was incorporated on Nov. 12, 1935. At that time it acquired the properties of Public Utilities Consolidated Corp. It operates in Arizona, California, Colorado, Idaho, Maine, Vermont, and Washington, and Alaska. Services offered include electric, gas, telephone, water, ice, and cold storage. Electric service is provided in Arizona, Idaho, Vermont, and Washington.

But contrary to opinion, Citizens Utilities is not a holding company. It owns all its electric and gas properties directly instead of through subsidiaries. However, the company does have two subsidiaries; but as these are not electric or gas companies, the Public Utility Holding Company Act does not apply.

Revenues at Record High . . . Under the present management operating revenues have soared. In 1945 they were only $2,418,600, but in 1953 they were over $5.5 million, an increase of over 100%.

Net income has made an even greater increase, up 505%, while earnings per common share went up

Here are the company's questions . . .

1. Do you think our annual reports contain too much information or are too long? .....

2. What, if any, general categories of information are included in our annual reports, which you would like to see treated in the future? .....

3. With reference to the front covers of our annual reports for the years 1952, 1951 and 1950, which cover did you prefer? ..... Why? .....

4. Which of the following most influenced or was responsible for your decision to become a stockholder in Citizens Utilities Co (rank in order of importance if more than one):

   (a) Company's annual reports .....
   (b) Company's annual report advertisements .....
   (c) Brokers' memoranda .....
   (d) Company's stock dividend policy .....
   (e) Advice or recommendation of broker, investment counselor, friend, or others (please specify) .....
   (f) Company's earning record .....
   (g) Write-up of company in financial statistical services .....
   (h) Company's diversification .....
   (i) Other (please specify) .....

5. Which of the following most influenced or has been responsible for your decision to remain a stockholder of Citizens Utilities Co (rank in order of importance if more than one):

   (a) Company's annual reports .....
   (b) Company's annual report advertisements .....
   (c) Brokers' memoranda .....
   (d) Company's stock dividend policy .....
   (e) Advice or recommendation of broker, investment counselor, friend, or others (please specify) .....
   (f) Company's earning record .....
   (g) Write-up of company in financial statistical services .....
   (h) Company's diversification .....
   (i) Other (please specify) .....

6. Any other suggestions or comments .....

Citizens Utilities Co Common Stock

525%. In 1945 the earnings per share were 20¢ as compared with $1 a share in 1953, based upon 907,196 shares of stock outstanding at Dec. 31, 1953. At present the company is paying 12¢ per share quarterly in cash, plus 3% in stock annually. The stock is being traded over the counter at the present time.

Over 95% Compliment Management . . . Of the stockholders who answered the questionnaire, over 95% complimented the present management. One stockholder said, "The management deserves the highest praise for the phenominal growth and wise diversification." Another said, "I congratulate management for its fine record." Still another said, "We are glad to be a part of such a fine company."

Comments on Annual Report . . . The annual report came in for some criticism as being "too elaborate," "too expensive," and longer than necessary. But more stockholders wanted the report expanded to include such information as this:

- Book and market values of stock for past ten years.
- Future prospects of the company.
- Long and short range growth policy.
- Breakdown by categories of service rendered, of plant investment, net income, and yield.

The front covers of the 1950, '51 and '52 annual reports proved to be popular.

Suggestions and Comments Galore . . . The stockholders were generous with their comments and suggestions. Here are some samples:

"After investing in 1946 my 100 shares have amounted to 362 shares, including stock dividends. Like the way the company has progressed."

"Was told that Dick Rosenthal is a terrific operator. Believe it. That's why I bought this issue mostly after reading 'Barron's' article."

"Strengthen finances for possible readjustments in the economy."

"I think competition between companies in putting out flashy reports is foolish."

"Hope the company has in training a good understudy for R. L. R., just in case he decides to retire."

"Consider the management the best public utility management in the country."

"Your policy of diversification in my opinion is a wise policy to follow."

And what does Richard Rosenthal think of the results of the survey? He called them "quite interesting." In fact, he said, many of the suggestions have been incorporated into the 1953 report being mailed this week. There is no better way of succeeding in the utility business than by keeping your stockholders, and your customers, happy.

. . and here are the investor's answers

1. Report too long — 10.25%
2. Specific suggestion — 8.07%
3. Specific opinions — 18.32%
4.

	Total	1st Choice	2nd Choice	3rd Choice	All Others
a.	5.29%	2.70%		4.00%	9.21%
b.	1.11				2.54
c.	6.26	5.41	3.74%	2.67	8.57
d.	15.99	9.01	25.24	21.33	16.51
e.	28.37	59.91	8.42	10.67	17.14
f.	16.97	9.01	31.76	20.00	16.83
g.	3.06	.90	3.74	1.33	4.76
h.	15.02	1.35	24.30	32.00	17.46
i.	7.93	11.71	2.80	8.00	6.98

5.

a.	8.72%	3.47%	4.14%	14.03%	11.65%
b.	.94			.93	1.77
c.	2.71	2.48	.69	.93	4.05
d.	22.61	19.80	30.34	21.50	21.52
e.	11.78	19.80	7.59	5.61	10.89
f.	26.50	39.11	27.59	14.95	22.78
g.	2.94		1.38	.93	5.57
h.	18.26	3.96	24.14	37.38	18.23
i.	5.54	11.38	4.13	3.74	3.54

e. Recommended by

Broker	48.72%	50.00%	66.67%	66.67%
Investment Counselor	14.53	33.33		21.21
Friend	28.21	16.67		12.12
Broker Friend	5.12			
Other	3.42		33.33	

e. Recommended by

Broker	51.52%	83.33%	66.67%	42.11%
Investment Counselor	18.18			26.32
Friend	27.27	16.67	33.33	26.32
Broker Friend	3.03			
Other				5.25

Engineers' Wages Hit New Peak

Average starting salary of Illinois Tech graduates put at $373 per month, an all-time high for the field

Average starting salaries of January engineering graduates of the Illinois Institute of Technology, Chicago, reached an all-time high of $373 per month. This is an increase of $32 over a year ago and $11 more than those reported in June, 1953.

The average is based on a survey of mid-year engineering graduates by Earl C. Kubicek, director of alumni relations and placement at Illinois Tech.

The figures are for students receiving a bachelor's degree and planning to work a 40-hour week Kubicek pointed out.

Chemical engineering graduates received the most lucrative starting salaries, with an average of $394, compared with January, 1953, figure of $327.

Other engineering fields and the average salaries received by mid-year graduates of 1953 and 1954 are as follows:

	1953	1954
Civil	$353	$388
Mechanical	353	370
Electrical	345	367
Industrial	356	350

The salary average was up 9.3% over a year ago. All the graduates who filed for placement left school with jobs. Each man had an average of 7.5 interviews.

Averages, based on salaries of combined June and mid-year graduating classes, in recent years follow: 1949, $282; 1950, $258; 1951, $295; 1952, $328, and 1953, $362.

Kubicek pointed out that the average starting pay for Illinois Tech engineering graduates is above the national average.

"This is because many IIT students have working experience in industry prior to graduation," he explained. "They work with firms on the cooperative work-study plan during the summers, part-time while attending school, or at other times before and during their college careers."

*Some Sound Advice From Sam Schweiger**

"If you're an average person you more or less take your job for granted. Like good electric service your job was there when you decided to take it on and it's been there for you every day. Outside of figuring that you're over-worked and underpaid, and no doubt that the pasture is greener on the other side, you don't rear back and give your job a good look.

Two of the most important things about our job hardly ever get a tumble from our thinking gears, namely:

1. Some folks have invested about $65,000 in tools and equipment to make our job possible. (In average business it's $12,000 per job, but in the electric it's much higher).

2. A small group of men, call them officers or management, has the responsibility for keeping this job going for us.

Everyone working for wages depends upon these two elements for a regular place at the table. Some few, of course, have their arm in another kind of pie and could continue to eat without a job. But not many. Some, also could go into some kind of business on their own and make a go of it. People do it every day. Also some try and fall on their face and have to look again for a job. The big majority of people in the United States depend on jobs, the kind of job determining how high or low on the hog they chew.

Somebody, or a lot of somebodys, had put up the $65,000 for my job with Southwestern. I didn't bring even 65¢ along to put into it. So I want to stop and think a little about the people who paid for the stuff that makes my job possible. I want to thank them. I've worked always for other people. So someone has always made my work possible. If these people ever quit putting money in stuff that makes my job, I'm sunk.

Then I'm grateful for all the managers of every business that I've worked in for managing it in such a way that a job was available. In the case of Southwestern the top burden of responsibility falls on the president, Captain Wilkes. He and other managers of the company have to operate the $65,000 investment in my job in such a way that this outfit doesn't go broke or fall into the hands of socialists. If they don't run it right, I'm out of luck. So I want to say thanks to these fellows, the managers.

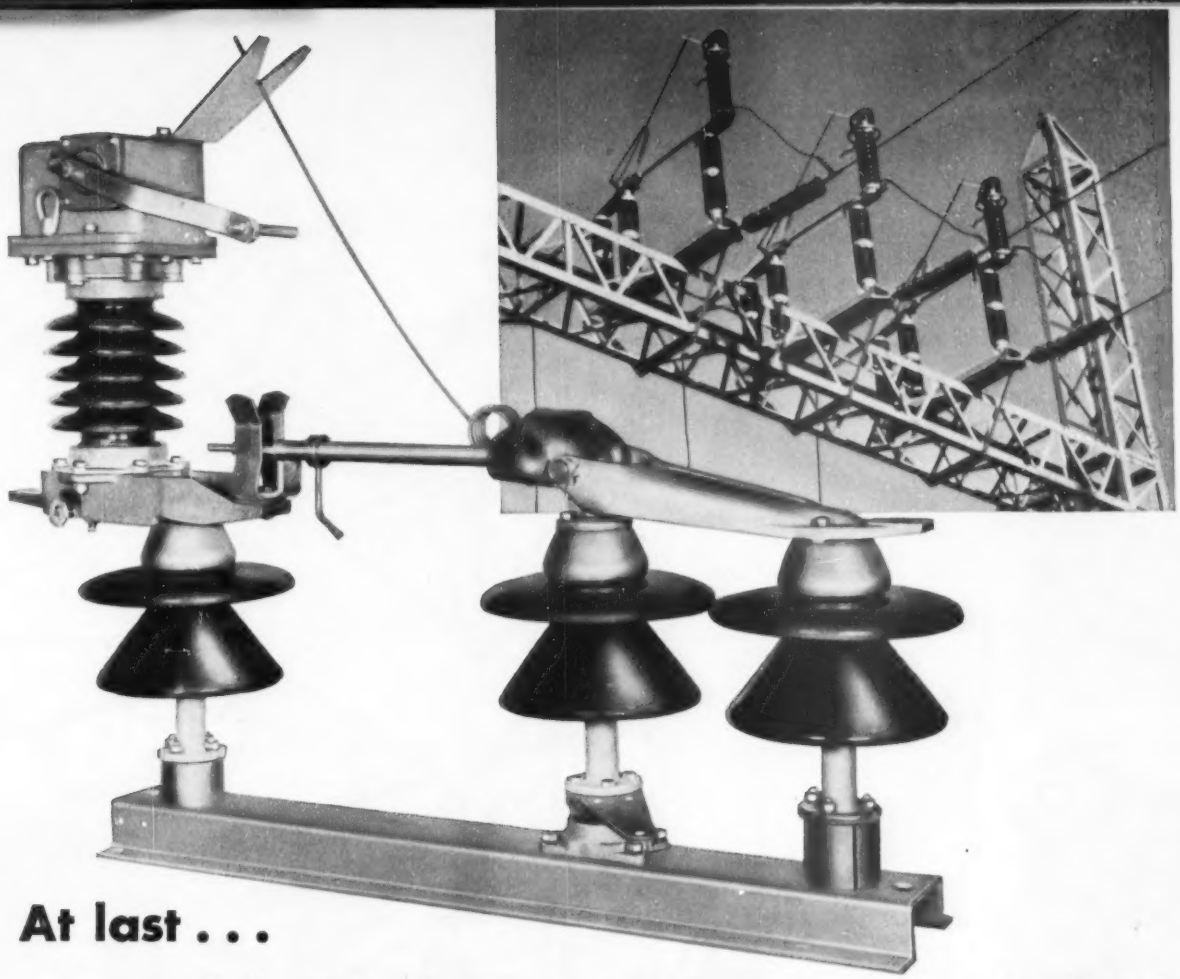
If every person in the United States, that works for others, and that's most of us, would stop to think about these things a little, we'd all act different. Because without investors and managers it's no soap for anybody. Everyone can't run their own business, even if they were able. There have to be jobs. So the system and the people that make jobs possible are very important to everyone.

So to the combination of investors and managers who keep me in operation, I want to express gratitude. And you know investors are not fat Wall Street bankers. They're people like you and me who are able to save a little money and invest it in insurance or what have you. Yes, I'm for the investors and for the managers, because they have set me up in business and kept me there. We need more of that, not less, because my son, too, will probably need a job."

*This article is reprinted from the February issue of "The Southwestern," house organ of the Southwestern Gas & Electric Co. It appeared in the column, "Semi-Serious," written by Sam Schweiger, advertising manager.

LABOR BRIEFS

Wage Settlements . . . Wisconsin Electric Power Co and Local 494 of the International Brotherhood of Electric Workers (AFL) agree to a 3% wage increase along with several improved fringe benefits . . . Puget Sound Power & Light Co and IBEW (AFL) have agreed to a 2% wage hike, retroactive to Jan. 1, 1954. The contract guarantees eight paid holidays a year, regardless of the day of the week on which they fall . . . Dallas Power & Light Co, and the IBEW (AFL) have agreed to a 2½% increase in wages, including adjustment of "inequities." The contract became effective on March 11, 1954.



At last . . .

a switch that interrupts load current safely!

Exclusive Westinghouse VLB Switch can reduce switching costs—Now you can use the inexpensive Westinghouse VLB Switch to interrupt load currents on high-voltage transmission lines. The arc is completely enclosed so that it *cannot* develop into a system fault—a distinct possibility if horn-gap switches are used for interrupting duty (a job for which they're not designed).

Interrupts 600 amps—The VLB interrupts line-charging current, transformer magnetizing current or up to 600 amps of load current. Dependable performance under all these conditions provides the basis for interrupting rating.

New interrupter—The problem in designing the VLB Switch was to develop a small but effective interrupter to add to the standard air break switch. It was solved by using a gas, sulfur hexafluoride, which has exceptional arc-extinguishing properties.

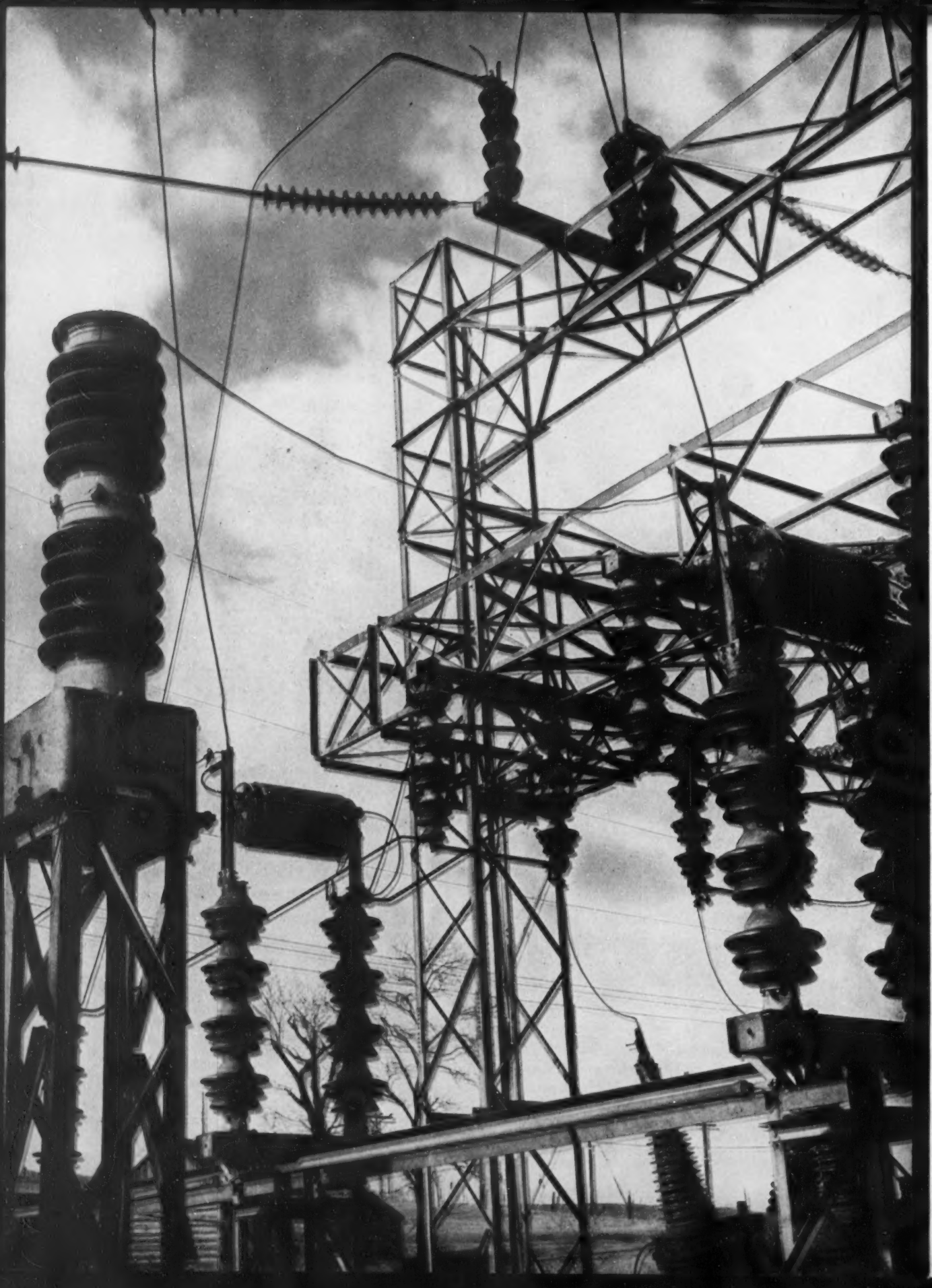
No gas loss—This switch may be operated like a conventional disconnecting switch. When the main blade is raised, the current is carried through the interrupter. The blade engages an arm on the interrupter unit which trips a toggle and snaps open the contacts. The interrupter is hermetically-sealed and no gas is consumed during operation, nor does it deteriorate.

Thoroughly tested—Exhaustive laboratory tests of the VLB show that it is a NEMA Class A device and will operate 500 times without maintenance. Field tests have confirmed laboratory findings.

Replaces air switches—The new switch is available in ratings from 7.5 to 115 kv (138 kv effectively grounded). It can replace existing air switches. Write now for descriptive information on this new device that makes an air break switch do what you have always wanted. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-60847

YOU CAN BE **SURE**...IF IT'S

Westinghouse



Helping the industry meet its growing loads

Increasing Centralized Control with New, Improved Power Line Carrier

This Westinghouse coupling capacitor connects the power line carrier's high-frequency, low-voltage current directly to a 69,000-volt transmission line. An important link between the power system and its communication and control facilities, it makes possible such indispensable carrier functions as telemetering and supervisory control.

This means faster, more efficient dispatching of power. Why? Because (1) circuit loadings are continuously reported to the power dispatcher by telemetering, (2) supervisory control keeps him informed of breaker and other device positions, and (3) the power dispatcher has instant control of remote stations.

To make centralized control more flexible and to facilitate dispatching, Westinghouse developed the new Type FD power line carrier equipment. These electronic assemblies and coordinating equipment now provide many entirely new features for using available transmission facilities more efficiently. Telemetering and supervisory control are more useful than ever . . . carrier signals for protective relaying, automatic and manual remote circuit breaker tripping, teletypewriters, and voice communication have all been improved.

Some important features of this new carrier system will be found in the adjoining column. They are end products of more than 30 years of Westinghouse experience in the design and manufacture of power line carrier and associated equipment . . . and of an incessant, carefully organized search for practical answers to the operating problems of the electric utility industry.

J-97178

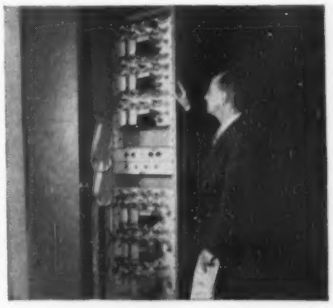
YOU CAN BE SURE . . . IF IT'S Westinghouse

More services with new receivers

The increased use of carrier by the utility industry has created a need for more and more channels. Westinghouse Type FD carrier alleviates the resulting problems by allowing channels to be spaced more closely together. Chief reason for this channel economy is the unusually high selectivity of the Type FD receivers. More services result, not only from this but from the new, wide frequency spectrum range of 40 to 200 kilocycles.

Longer tube life with current regulators

Wide voltage variations, normally encountered with station batteries, cut the life of vacuum tubes. Westinghouse Type FD carrier provides, for the first time, regulators to stabilize heater current over the operating range and thereby neutralize adverse effects on vacuum tubes. These tubes operate at peak performance, longer — especially important in relaying assemblies where tubes must be ready for instant response of maximum effectiveness.



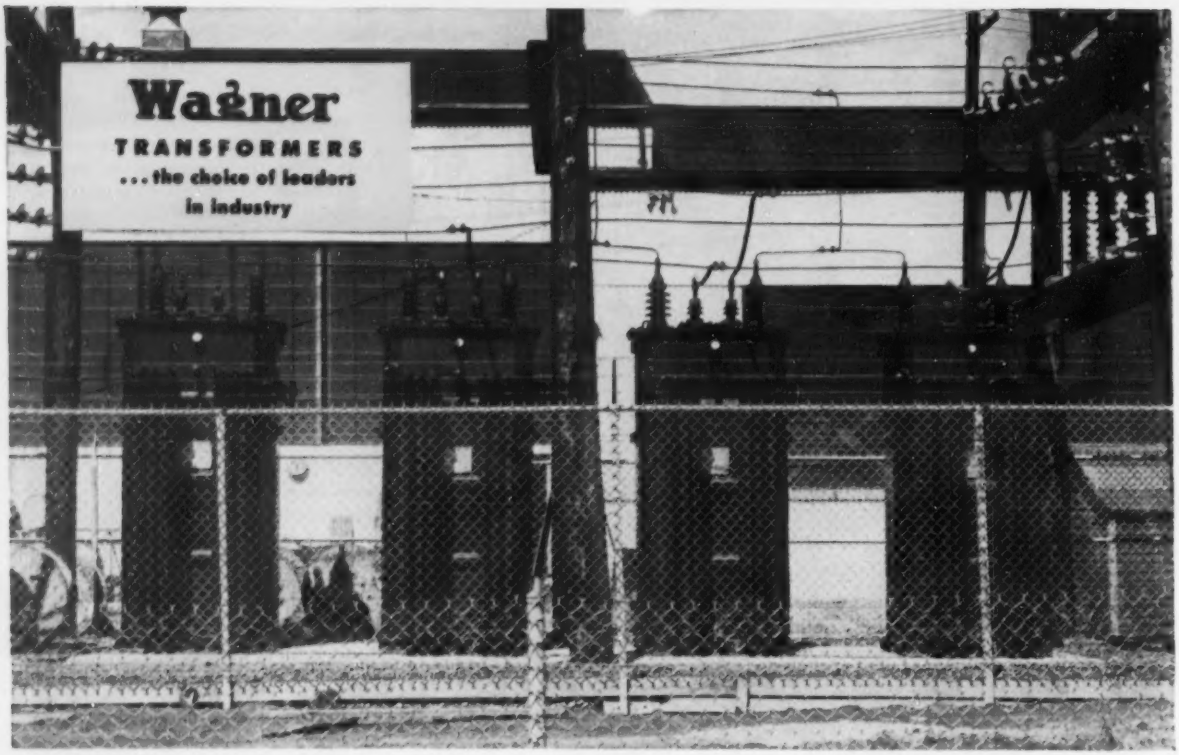
New swinging rack construction gives Westinghouse Type FD power line carrier greatly improved accessibility.

Station battery dependability for voice communications, too

The new Type FD assemblies for all carrier functions including voice communication operate directly from 60 or 120-cell station batteries. Though a-c operation is also available, d-c operation is usually recommended. The brass-tacks reason: top dependability.

Narrow-band frequency shift units permit longer channels

The new limiter and discriminator circuits of Type FD frequency shift equipment now make longer carrier channels practical. Furthermore, operation even under unfavorable conditions is consistently good. The very narrow band width (only ±60 cycles) greatly increases the number of available channels yet accommodates high-speed functions such as frequency-type telemetering and teletypewriting better than ever before.



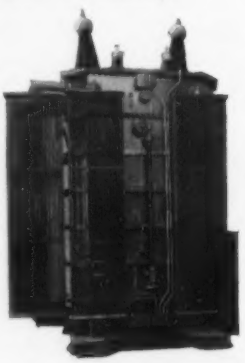
power to build a flying "Work Horse"

The helicopter is a machine of marvelous maneuverability. It can fly straight up or down, go forward or backward, fly fast or slow—high or low! The tandem-rotored Air Force H-21 "Work Horse," capable of carrying up to 20 troops plus crew of 2, is a product of the pioneer builder of transport helicopters—Piasecki Helicopter Corporation of Morton, Pennsylvania.

Piasecki occupies the world's newest and largest helicopter plant, where electric power is delivered by the bank of Wagner Power Transformers shown in the photograph above.

Banks of Wagner Power Transformers can be found at many great industrial plants . . . for the task of supplying power for the manufacture of mighty machines—used on land, sea, or in the air—is a familiar one to thousands of Wagner Transformers.

Wherever electric power is used—in industry, commerce, city and farm—Wagner Transformers are found on the job, supplying proper voltages for every purpose.



Your nearby Wagner engineer can help you select the right transformers for *your* needs. Call the nearest of our 32 branch offices, or write us.

Wagner Electric Corporation
EST. 1891

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BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

ELECTRIC MOTORS
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AIR AND HYDRAULIC

WT53-13

ERNEST E. ALTHOUSE

GEORGE H. LANDIS

Central Hudson Names 2 VP's

Althouse and Landis are appointed vice presidents in charge of operations and engineering, respectively

Ernest E. Althouse, general operating manager for Central Hudson Gas & Electric Corp, Poughkeepsie, N. Y., has been appointed vice president in charge of operations. In another executive appointment, George H. Landis, chief engineer, was named vice president in charge of engineering for the utility.

Started as Engineering Aide . . . Associated with Central Hudson for 25 years, Althouse started his career with the utility in 1928 as an assistant engineer. Later he held the positions of design engineer, operations superintendent and division superintendent. In 1938 he was made assistant electric distribution manager, later serving as distribution manager.

Althouse was appointed in 1951 as administrative assistant to the vice president in charge of operations and a year later was named electric operating manager. In November, 1953, he was promoted to general operating manager.

Worked in Operating Dept . . . Landis' career with Central Hudson began in 1922 when he joined the Newburgh (N. Y.) operating department as transmission engineer. Five years later he was named construction superintendent in the Poughkeepsie general operating department, advancing to division operations manager. In 1929 he was made distribution superintendent, becoming superintendent of transmission in 1932. He became manager of electric distribution in 1939 and chief engineer in 1947.

•

Cornelius Lumsden, assistant manager of Upson County Electric Membership Corp, Thomaston, Ga., has been promoted to manager to replace **Frank Hawkins,** resigned.

Harry A. Winne, nationally known atomic engineer, and retired vice president of General Electric Co, has been chosen as recipient of the National Society of Professional Engineers' 1954 award. Winne, who retired last fall as vice president of engineering for GE after 43 years' service, will receive the award at the society's annual dinner in Milwaukee June 12.

C. B. Campbell, consulting engineer for the Steam Division of Westinghouse Electric Corp since 1952, has been appointed chief engineer for the division. He joined Westinghouse in 1919.

M. S. Oldacre, former director of research for Commonwealth Edison Co, has joined the senior scientific staff of Stanford Research Institute, Palo Alto, Calif. Oldacre, who has had 28 years experience in the utility field, will participate in developmental studies of energy in the institute's Division of Economics, working primarily with electric utility industry problems.

R. B. Sayre, vice president of Graybar Electric Co, New York, has been elected a director and a member of the executive committee of the company. He joined Graybar in 1921, becoming vice president at the beginning of this year.

Robert J. Gordon, assistant to the manager of the Housatonic Division of Connecticut Power Co, has been named manager of that division. **John C. Lawson,** formerly assistant to the manager at Torrington, has been appointed manager of the Torrington Division.

W. F. MAINGUY

Quebec Power Appoints Mainguy Vice President

W. F. Mainguy has been elected a vice president and a director of Quebec Power Co. Mainguy, also executive vice president of the parent firm, Shawinigan Water & Power Co, fills a vacancy created by the resignation of P. S. Gregory, who is retiring.

With the Shawinigan organization since 1928, Mainguy was vice president of distribution for the parent company for five years prior to becoming executive vice president in 1952. He became a director in 1953.

Branch Is SEE's President

HARLLEE BRANCH, JR

Harllee Branch, Jr, president of Georgia Power Co, has been elected president of the Southeastern Electric Exchange to succeed L. C. McClurkin, president of Savannah Electric & Power Co.

Other officers elected by SEE include three new vice presidents. They are W. J. Clapp, president, Florida Power Corp, first vice president; George S. Dinwiddie, president, New Orelans Public Service, Inc, second vice president; and L. M. Smith, president, Alabama Power Co, third vice president. The association also elected these directors: G. L. Furr, vice president, Appalachian Electric Power Co; and William C. MacInnes, president, Tampa Electric Co.

Branch was vice president and general manager of Georgia Power for two years before becoming president in 1951.

Prior to joining the utility firm in 1949, Branch was a member of the law firm of MacDougald, Troutman, Sams, & Branch, general counsel for Georgia Power Co. He had been associated with the law firm since 1931 and had handled legal matters for Georgia Power for more than 18 years.

Hi-Voltage Elects Hoffman President

Joseph D. Hoffman, executive vice president of Hi-Voltage Equipment Co, Cleveland, has been elected president. Hoffman, whose appointment became effective April 1, succeeds Lester C. Hart, who has retired. Hart, a founder of Hi-Voltage, will continue to serve the company as a member of the board of directors and in an advisory capacity.

The newly elected president graduated from the University of Missouri in 1925 with a BS degree in electrical engineering. After spending two years with Southwestern Bell Telephone Co as plant engineer, he joined James R. Kearney Corp in St. Louis. He remained with that company for 25 years, becoming vice president and chief engineer. Hoffman joined Hi-Voltage in 1953 as executive vice president.

JOSEPH D. HOFFMAN

When Hi-Voltage was founded in 1920, Hart assumed the presidency of the company, a post he filled until his recent retirement. Prior to this, Hart was associated with Railway & Industrial Engineering Co, where he pioneered in the development and application of air break switches for transmission lines and outdoor substations. At the turn of the century he was affiliated first with Cutler-Hammer Manufacturing Co, Milwaukee, Wis., and then, Youngstown (Ohio) Sheet & Tube Co.

Hart was honored in 1952 by National Electrical Manufacturers Association as one of the industry's pioneers. He holds 19 United States patents.

Mailman Elected Head of Roller-Smith Corp

With the purchase of Roller-Smith Corp, Bethlehem, Pa., by the Mailman Interests, the management of the corporation will be headed by Elmer T. Carlson, who will serve as vice president and general manager. Carlson is a retired General Electric Co executive. The new president of Roller-Smith is J. L. Mailman.

The Mailman Interests, active in the banking field, have investments in such fields as razor blades, washing machines, leather and rubber goods, and metal products. The Mailman Interests are managed by two brothers, A. L. and J. L. Mailman, new head of Roller-Smith. They own Amalgamated Electric Co of Canada. This company, whose main plant is at Toronto, manufactures all types of industrial electrical equipment.

The new general manager is a graduate of Northeastern University, Boston. He became identified with the Trumbull Manufacturing Co in 1928 as a sales representative in the Boston office. He advanced to president of Trumbull, which later became affiliated with General Electric. While with GE he served the company and its subsidiaries for many years in management and executive positions.

OBITUARY

Edward M. Ashworth, who retired two years ago as general manager and chief engineer of the Toronto (Ont.) Hydro-Electric System, died March 25 at Toronto. He joined the system in 1910, becoming general manager in 1924.

Raymond E. Brennan, 58, who served for about 13 years as treasurer and comptroller of Portland (Ore.) General Electric Co before resigning in 1944, died March 24 at Indianapolis, Ind. After leaving the utility, he was associated with a steamship firm.

Joseph B. McCall, Jr, 58, former executive of Philadelphia Electric Co, died March 26 at Philadelphia. McCall was an assistant secretary of the utility from 1919 until 1928, when he entered the real estate business. He was the son of the late Joseph B. McCall, Sr, former president of Philadelphia Electric.

POWERS American

Series 450 CONSTRUCTION AND OVERHEAD MAINTENANCE BODY

Does the Work of TWO TRUCKS

Ladder can be revolved 360° at elevations from 30° to 75°. In 23'6", 26'6", and 30'6" mechanical units, or 35' hydraulic model.

Body is 108" long, for installation on dual-rear wheel chassis having cab-to-axle dimension of approximately 60"

Derrick utilizes flexible steel cable instead of conventional center leg. Stows in loading area rack when not in use.

Here's a multi-purpose body that does work normally requiring two or more specially-equipped vehicles.

FOR OVERHEAD WORK . . . the body has a Powers-American mechanical or hydraulic Aerial Ladder, in a working height best suited to individual needs.

FOR SERVICE WORK . . . compartments provide space for the orderly storage of a wide assortment of tools and parts.

FOR CONSTRUCTION WORK . . . simplified, easy-to-use derrick handles poles up to 35 ft. in length. A 10,000 lb. underslung winch pays out cable beneath the body floor. A universal swivel sheave permits winch line pull in any direction, without limitation.

COMPLETE DESCRIPTION is given in Bulletin No. 118. A copy, with quotation, is yours for the asking.

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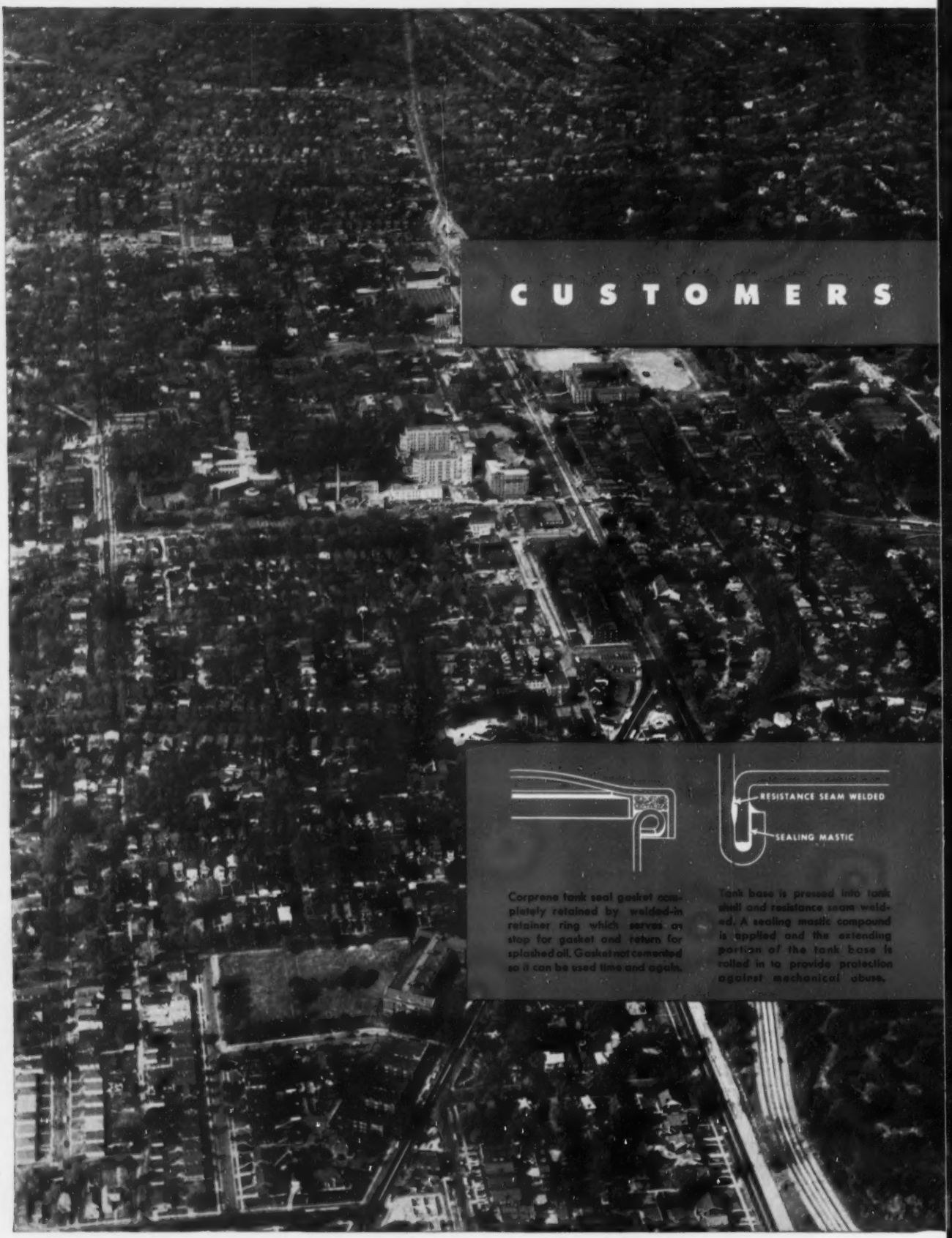
428 Latham Sq. Bldg. • Oakland 12, Calif.

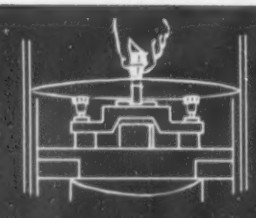

CUSTOMERS
RESISTANCE SEAM WELDED
SEALING MASTIC
Corprene tank seal gasket completely retained by welded-in retainer ring which serves as stop for gasket and return for splashed oil. Gasket not cemented so it can be used time and again.
Tank base is pressed into tank shell and resistance seam welded. A sealing mastic compound is applied and the extending portion of the tank base is rolled in to provide protection against mechanical abuse.

BY THE ACRE

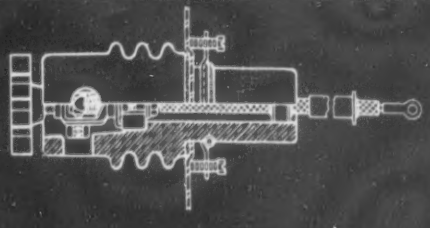
The housing developments springing up in every community have brought customers by the acre. Operating headaches by the acre have in turn been brought to distribution engineers. Feeders have to be extended . . . new substations put into service . . . secondary systems hung and put into operation quickly. For these new customers want, and expect, dependable service.

Design greater dependability into your distribution systems . . . eliminate voltage problems . . . build better customer relations by installing Moloney Distribution Transformers. To give your customers the service they deserve and assure your system of better service with less maintenance . . . make it Moloney all along the line.

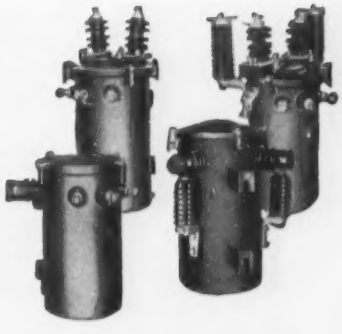
ME54-15



Positive action tap changer with operating handle located above hot oil level. Double-moving contacts snap into position with a wiping action that assures positive contact.



Moloney sidewall mounted high voltage bushings suitable for working "hot" with a molded high impact resistant phenolic-cold rubber protective cap.

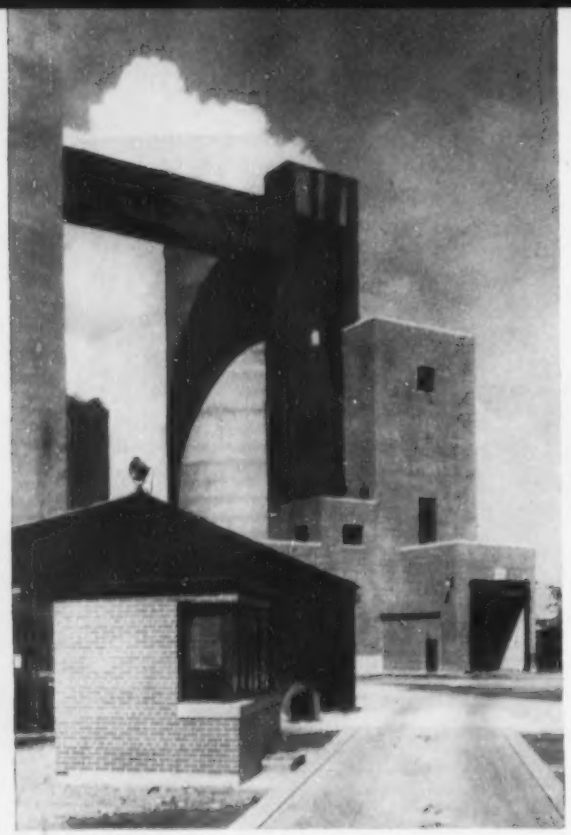


Moloney HiperCore Distribution Transformers are available in all standard ratings from 3 Kva up in both Conventional and CSP designs.

MOLONEY ELECTRIC COMPANY

Power Transformers • Distribution Transformers • Step Voltage Regulators • Regulating Transformers • Load Ratio Control Transformers • Unit Substations • Network Transformers • Constant Current Transformers • Capacitors • Transformers For Electronics

SALES OFFICES IN ALL PRINCIPAL CITIES • FACTORIES AT ST. LOUIS 20, MO. AND TORONTO, ONT., CANADA



SILO, LOADING HOUSE AND SCALE at Trenton Channel are essential to marketing fly ash. They cost little more than disposal facilities

Fly Ash: Asset or Liability?

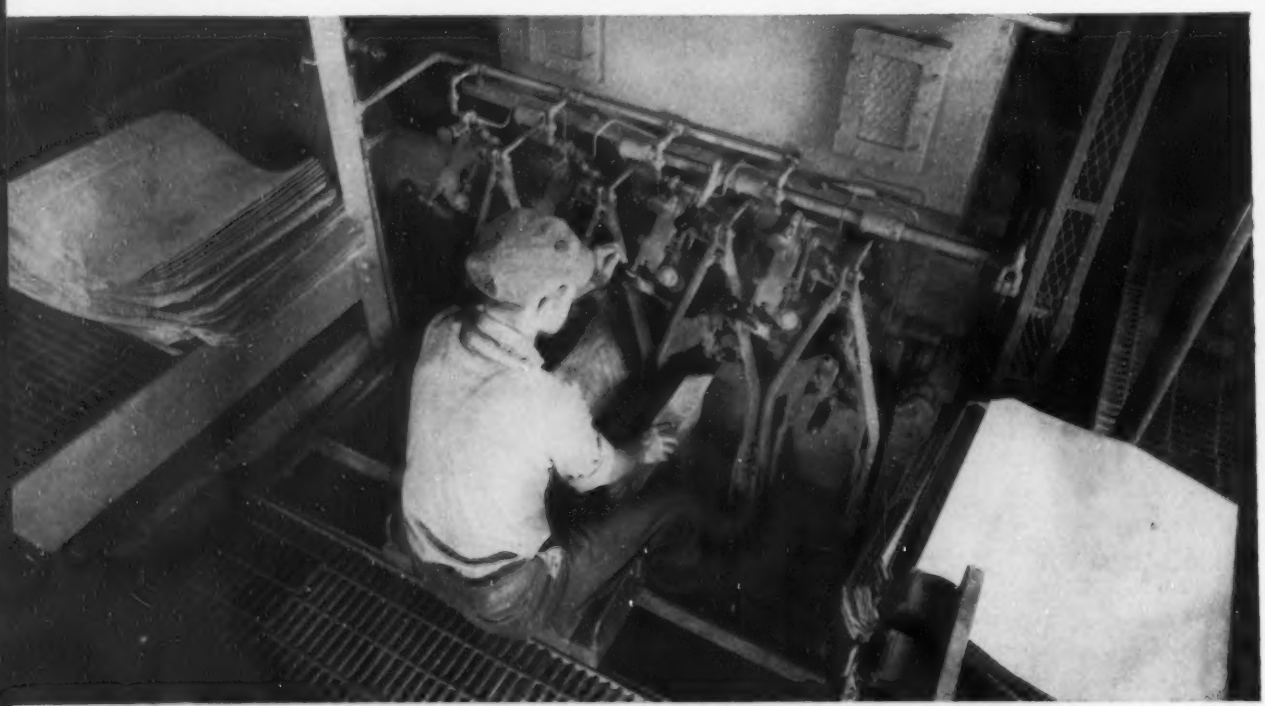
J. R. WILDE, Supervisor, Salvage Sales Division,
V. A. STACE, Assistant to Manager of Purchases,
Detroit Edison Co, Detroit, Mich.

Chemical Analysis

Chemical	Percentage
Fe_2O_3	9.10
C	4.00 to 10.00 (Depending on the Plant)
MgO	0.83
CaO	2.38
Al_2O_3	26.90
SO_3	1.28
TiO	1.35
CO_3	0.01
SiO2	45.93
P_2O_5	Trace
Undetermined	1.38

Sieve Analysis

Meshes per In.	% Ash Retained
35	0.1
100	3.3
150	3.0
200	4.6
325	8.6
400	7.0
Through 400	73.2
	99.8



BAGGING prepares fly ash for marketing although most of the ash is shipped in bulk. The packer machine feeds bags onto a portable conveyor carrying bags to truck or rail car. Machine operates at the rate of 700 to 1,000 70-lb bags per hour depending on the conveyance used

FLANGED CONNECTION on fly ash truck matches flange on receiving hopper. Compressed air blows the ash into bulk receiving system

Fly ash sales of Detroit Edison Co last year amounted to slightly over a quarter of its fly ash production.

The 1953 sale of 90,000 of 235,000 tons of fly ash was the result of a research and sales program to convert this liability into something like an asset. The need for such a program was underscored by the rapid growth of loads, with the consequent sharp rise in the production of fly ash as a byproduct. In 1952, 80,000 of 180,000 tons found buyers.

Recent sales of fly ash brought a return of $1 per dry ton. The unsold ash cost Detroit Edison about 60¢ per dry ton for transportation to a dump. Furthermore, the dump was maintained at the company's expense.

The same conclusions on the importance of fly ash sales can't be made for all utilities and industries with plants producing it. To sell the ash, a costly handling system must be installed within the plant, along with storage and loading facilities. The operation of these additional facilities takes manpower.

To Dump or Sell . . . Many plants can sluice the fly ash into a pipe-line and to a dump location a short distance away. Such plants would have to make a careful study to determine the economic feasibility of installing a system for salvaging and selling the ash.

Such study should consider the fact that most present and potential users demand a fly ash that is a reasonably consistent chemical product, containing elements in the proportions listed in the table above. The combustion and handling systems of many producers do not yield a consistent product.

Detroit Edison plants are in metropolitan, industrial, or resort areas. The company cannot dispose of fly ash by sluicing into nearby areas and therefore must transport it to dumps by truck or railroad car. The system it has installed for handling, storage, and loading for dumping also embraces the sales program.

When it became apparent that a fly ash program was urgent, the company set up an instrumentality for (1) finding commercial uses for fly ash and (2) developing markets for these uses.

Markets . . . In 1934 five years of research and development work brought a 20-carload sale of fly ash to the company's first commercial customer who planned to use his purchase in the manufacture of a fabricated building siding. The development program continued until more than 30 industries had been explored as possible users. Fields explored included: concrete, block, paint, putty, rubber, insecticides, paper, soap, fired clay products, foundry and facing sands, fertilizers, and filler for asphalt paving.

The City of Detroit became in 1939 the first large-scale outlet. After working with the company for many years, the city adopted fly ash for use as a mineral filler in asphalt paving mixes. This use saved the city's taxpayers considerable money and helped to establish fly ash as a competitive mineral filler of good quality.

Detroit Edison also entered into cooperative research programs with the Michigan State Highway Department and with various county and municipal road commissions, culminating in acceptance of the ash as an approved mineral filler. The asphalt paving field has since grown to be the largest single commercial outlet for fly ash, accounting for about 60% of the total ash sold in 1952.

Other Uses . . . Other commercial uses have developed more slowly. Detroit Edison, however, has used fly ash successfully for the past 15 years in most of its own structural concrete, including foundation pilings, substructures, turbine bases, load-bearing and other walls, columns, and floors.

Fly ash concretes have recently gained more general acceptance, largely because of the following:

1. The tremendous increase in the use of concrete and concrete products.

2. The results of long-term tests on fly ash concretes proving their merits.

3. Recent research by independent concrete technicians more clearly defining the advantages of this ingredient in concrete.

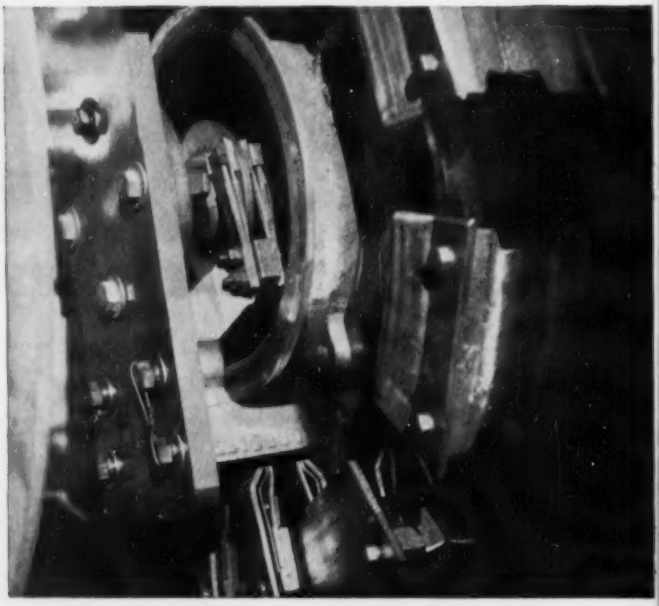
Detroit Edison fly ash is also finding wider usage in concrete building products and in grouting work. Appreciable tonnage is being sold to companies for use in their own patented processes. The latter firms demand a product strictly uniform so that Detroit Edison now exercises constant vigilance to assure that each customer gets what he wants.

Storage Facilities . . . Rapid load growth and the change to larger boilers with higher temperatures and pressures have accelerated the steep rate of increase in Detroit Edison fly ash production. The company must evaluate

(*Continued on page* 47)

Practically after Operating

PHOTOS TAKEN AFTER 1,240,000 OPERATIONS



The unretouched pictures at right show the condition of contacts and mechanism disassembled from a 17-year-old regulator of a western utility. After 1,240,000 tap changes under load, neither mechanism nor contacts of this power regulator show appreciable sign of wear.

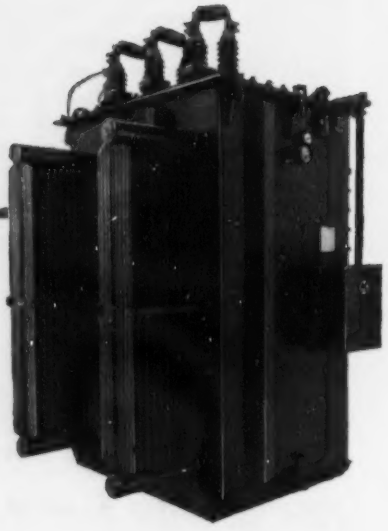
The regulator was disassembled when it was found necessary to replace deteriorating gaskets installed when the regulator was built in 1937. After thorough inspection the unit was placed back in service.

Field and Laboratory Proof

This operating record offers field proof in addition to laboratory tests that have proved you get years of practically trouble-free operation from Allis-Chalmers 5/8% step regulators.

You get the reliability and rugged construction of the *Quick-Break* mechanism on all Allis-Chalmers 5/8% step voltage regulators as well as on transformers equipped with tap changing under load. Performance records like this one — in thousands of applications — are convincing proof that it pays to have Allis-Chalmers tap-changing equipment on your system.

A-4244



Designed Features Add to Service Life

There are four reasons why you get such an excellent service record from Allis-Chalmers regulators. (1) Contacts are large. (2) They are manufactured from arc-resisting materials. (3) The small 5/8% steps reduce the amount of kva to be interrupted. And (4), perhaps most important, famous *Quick-Break* mechanism provides fast, clean contact separation, snapping the moving contacts from one position to the next before there is time for damage to occur.

In addition, with all Allis-Chalmers 5/8% step regulators you get advantages like unit construction, *Feather-Touch* control, and twenty years of experience with 5/8% step equipment. Get the complete story from your nearby Allis-Chalmers district office, or write Allis-Chalmers, Milwaukee 1, Wisconsin.

No Wear for 17 Years

ALLIS-CHALMERS

Originators of 5/8% Step Regulators

PENNSYLVANIA LOAD RATIO CONTROL EQUIPMENT OPERATES *Quietly*

2500 Kva, 3 Phase, 60 Cycles,
11700 Delta — 2400 Delta/4160Y volts.

Manufacturers of Load Ratio Control Equipment have long concentrated their attention on designing a snap action tap changer mechanism that would operate quietly.

Pennsylvania tackled this problem a number of years ago and in 1949 perfected the *Silent Snap Switch.* Millions of "in the field" operations have verified its sound design principles and fine construction.

The Silent Snap Switch moves swiftly and quietly in response to the demands of the automatic control mechanism. Voltages are raised or lowered in comparative silence.

High among the advantages of quiet tap changing operation are the following:

1. less wear and tear on the equipment;
2. no breakdowns from mechanical impact;
3. longer and more satisfactory tap changing mechanism life.

Quiet Load Ratio Control transformers are especially desirable for installation in residential areas where undue noise, and the clanging and banging formerly associated with the operation of underload tap changing equipment are extremely objectionable.

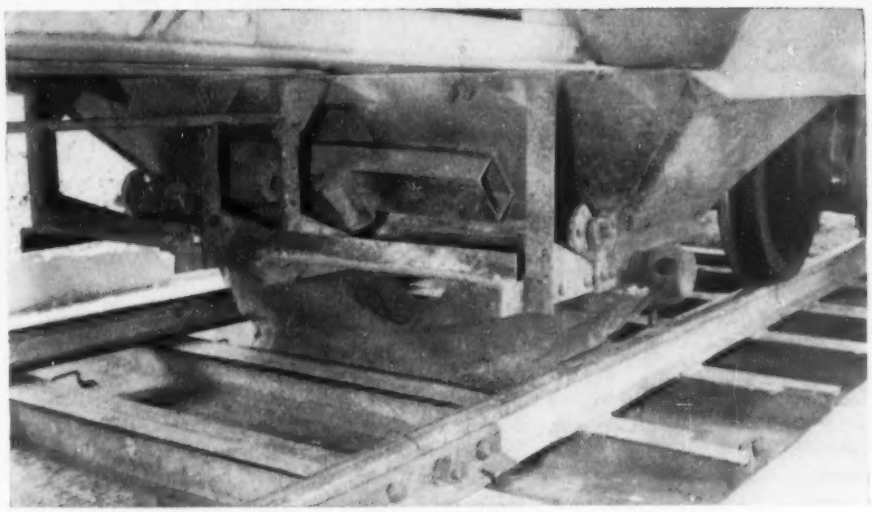
Pennsylvania Load Ratio Control transformers with the Silent Snap tap changing action are available in sizes up to 7500 Kva and in all voltages.

For complete information, write Pennsylvania Transformer Company, Canonsburg, Pa., and ask for Catalog 5112.

PENNSYLVANIA TRANSFORMER COMPANY

A McGraw Electric Company Division • Canonsburg, Pa.

CONCRETE PRODUCTS have fly ash as a component, and Detroit Edison uses the mineral filler in much of its concrete construction



COVERED HOPPER CAR with a flanged canvas connection facilitates shipping fly ash in bulk, the most economical manner of handling it

markets for possible absorption of the new tonnage and for the direction of sales efforts.

In developing present markets, the company found that large storage facilities were required to satisfy peak demand for fly ash. Daily demand at one company plant ran as high as 600 tons per day during the summer peak, when the maximum production of fly ash in that plant was approximately 350 tons per day. Winter sales frequently drop very low.

Storage capacity at Detroit Edison's four fly ash producing plants is:

Marysville	1,500 tons
Conners Creek	2,400 tons
Trenton	2,100 tons
St. Clair	3,600 tons.

Shipping . . . Present customers require dry fly ash. Such ash must be bagged or shipped in bulk in covered hopper cars or tank trucks. As new customers are seldom equipped to handle bulk fly ash, Detroit Edison usually recommends that they accept the bagged product until convinced of its value.

The savings most large users can realize through buying in bulk justify installation of bulk-handling equipment. Standard bulk cement elevators, screw conveyors, and feeder valves can be easily modified to handle the bulk ash.

Problems Remaining . . . These major problems in securing full advantage of several large potential markets remain:

1. Seasonal characteristics of these markets.

2. High storage cost of dry ash in large volumes and getting those volumes into and out of storage efficiently and economically.

3. Ash becomes moist when stored outside and cannot be handled efficiently by present mechanical systems, put into or taken out of bin storage without jamming, or dispensed in accurate amounts from bins.

Detroit Edison is extending its development program beyond the asphalt paving, concrete, and concrete products industries in an effort to reach into other fields.

ENGINEERING MEETING

"No plans to give away TVA" . . . .

Interior Secretary D. C. Mc Kay to American Power Conference after introduction by Northwestern University President J. R. Miller at All Engineers Dinner

"TVA couldn't pay its way if—" . . . .

C. Hamilton Moses, chairman, Arkansas Power & Light Co at Light's Diamond Jubilee Dinner of the conference

Industry leaders, engineers, government officials exchange views at . . .

16th American Power Conference

Bringing together industry leaders, government officials, and utility engineers, along with 125 students from 16 universities, the 16th American Power Conference set a new attendance record. Over 2,500 attended the three-day meeting at Chicago, March 24-26.

The two federal officials of most importance to the power industry were speakers. Secretary of Interior Douglas McKay was the principal speaker of the All Engineers Dinner, March 25, and the chairman of the Federal Power Commission, Jerome K. Kuykendall, spoke at the luncheon on the same day.

McKay pointed out that the government had no plans for eliminating the preference clause in disposal of power. Moreover, McKay said that he would not scuttle the reclamation program, the Bonneville Power Administration, or give away the Central Valley Project. And so far as he knows the federal government has no plans to give away Tennessee Valley Authority.

High Potential Hydro Capacity . . . Kuykendall pointed out that the FPC estimated total potential hydroelectric capacity in the country is 109 million kw of which only 21% or 23 million kw has been developed. He did not offer estimates of the energy available or cost of developing this capacity.

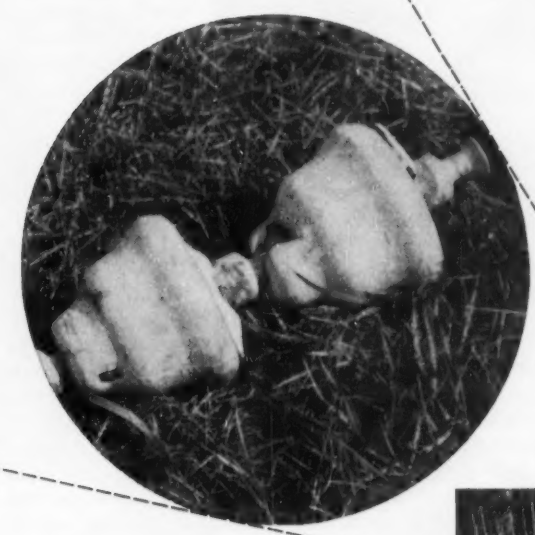
In an address at the Light's Diamond Jubilee dinner C. Hamilton Moses, chairman, Arkansas Power & Light Co, said that in the last ten years Arkansas had failed on a number of occasions to attract new industries because private utilities there could not compete with tax-favored TVA rates. Despite claims that it's paying its own way, TVA last year would have run $47 million in the red, Moses said, if it had paid the same taxes as other utilities and had paid just 3% on the money advanced by the federal government.

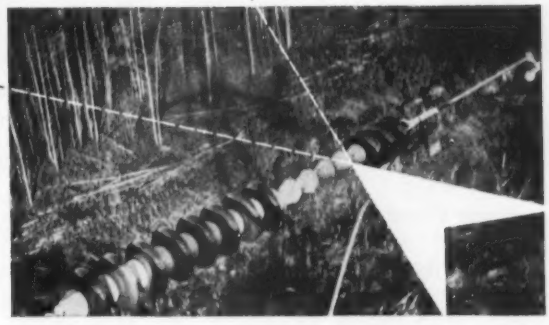
Dr J. E. Hobson, director, Stanford Research Institute, again (EW, Feb. 8, p 74; April 5, p 186) presented his paper, "Research and the Electric Power Industry," jointly authored with Dr W. A. Lewis, dean of the Graduate School Illinois Institute of Technology. He called on the utilities to spend $7 million per year in setting up a laboratory staffed with 600 to 700 persons to do fundamental research on insulating, magnetic, conducting, structural dielectric materials.

Vice Adm Harold G. Bowen, executive director, Thomas Alva Edison Foundation, Inc, presented a review of the beginnings of the light and power industry.

Challenge to Engineers . . . Unsolved technical problems facing the utility industry today offer a specific challenge to engineers, Walter H. Sammis, president of Edison Electric Institute and Ohio Power Co, told a conference luncheon. To stay on top, the industry must have engineering leadership of top quality. He said the industry needs all kind of engineers, designers, administrators, those with a talent for selling, and those who like to work with people. To such energetic and

Smashed... and still strong





thanks to liberal safety factor in O-B Insulators

Stripped of porcelain by a freak blasting accident, these O-B Suspension Insulators stayed on the tower—in service—for five days before they could be conveniently replaced. Afterward, the six battered units were sent to our laboratory for examination. Mechanically, all but one comfortably exceeded rated strength, and the exception was only a few hundred pounds short of that value. All others also sustained voltage sufficient to flash from the lower edge of the cap to the pin, indicating that the porcelain left within assembly areas between caps and pins was still sound.

This was the expected result from porcelain as an insulating material. It is not a heat-tempered material; does not have high residual internal stress. Therefore it is not subject to spontaneous, complete disintegration of the whole part if one piece is broken off.

Accidents of this sort tend to make prudent builders and operators expect the unusual, although they cannot predict what it will be, or when. Instead, they rely on O-B Suspension Insulators to perform far in excess of rated capacities if required to do so. Liberal safety factors are a responsibility which O-B accepts and meets in the manufacture of suspension insulators.

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Dr John T. Rettaliata, president, Illinois Institute of Technology; J. D. Cunningham, past-president, ASME; Walter Sammis, president of EEI; and Louis K. Silcox, president, ASME

ambitious men the industry can promise that they will be kept busy.

High school, rather than college, is the critical point at which students should decide upon a technical career, Major Lenox R. Lohr, president, Museum of Science and Industry, said in opening the conference. The student's decision before his junior year is required so that he may take essential science courses. Major Lohr appealed to teachers to make mathematics and physics more interesting to integrate students into practical affairs of after life.

Atomic Power . . . By 1964 2 million of the 171 million kw of generating capacity installed in the U. S. will use atomic energy as a heat source. However, 135.8 million kw, by far the bulk, will still be produced by the thermal cycle, A. C. Monteith, vice president, Westinghouse Electric Corp, told a luncheon meeting. Only 31.5 million kw will be hydroelectric installations, he said. Monteith saw the thermal cycle as the one practical method for converting any known energy source into electricity. In an apparent reference to the atomic battery, Monteith said power system equipment like turbines, generators, and transformers will not become obsolete except as it becomes economically advisable to retire it.

Sharing this view was Dean D. L. Loughridge, Northwestern Institute of Technology, who predicted that atomic plants for generation of power will cause no revolution in the power industry in the foreseeable future. Studies of North American Aviation Corp, he said, show that with 3% depreciation, 6% profit, and 4.5% for taxes, a sodium-cooled, graphite-moderated reactor generating 200,000 kw could produce power at 7.9 mills per kwhr. Even with 3-4 mill power a saving of more than 5-10% in production cost of large fuel and power users is highly unlikely.

In discussing the outlook for nuclear fuels in power generation, W. F. Friend, Ebasco Services, Inc, estimated that world resources of uranium and thorium represented between 20 and 23 times that in the remaining conventional or fossil fuels. In discussing the economics of various types of nuclear fuel, Friend said a thermal reactor having 0.35% utilization factor requires 92 lb fuel per 10^6 kwhr and provides heat at 3.23 mills per kwhr. The regenerative reactor having 1.0% utilization factor requires 32 lb fuel per 10^6 kwhr and provides heat at 1.13 mills per kwhr while the breeder reactor having a 50% utilization factor requires only 0.65 lb fuel per 10^6 kwhr and provides heat at 0.02 mills per kwhr.

Turbines Getting Bigger . . . Turbine generator discussion centered around feasibility of larger units. Units of 250 and 260 Mw currently being installed are no larger for today's power systems, relatively, than the much smaller units of 10 to 12 years ago were then. Manufacturers indicated that units up to 500 Mw could be built today if users were ready for them.

R. S. Neblett, General Electric Co, discussed the 125,000 kw, 4,500 psi, 1,150F unit now being built. He predicted that 1,400F with 1,300F reheat would be in the picture by 1975. However, Neblett said that more attention should be given to the low-pressure, low temperature end of the cycle.

Clarence C. Franck, Westinghouse, visualized as "expendable" the turbine for the high-pressure end of supercritical pressure units. He suggested a unit of supercritical pressure might be built with plans to replace the shell of the super-pressure section in say five years when advancements in metals developments might make it possible to build on a permanent basis.

C. D. Wilson, Allis-Chalmers Manufacturing Co, stressed the possibilities of units of larger capabilities but smaller size and weight with the generator fully supercharged and a close-coupled, cross-compound turbine.

C. E. Blee, TVA, described the 250-Mw, 2,000-psi, 1,050F reheat units for Gallatin plant. They are tandem-compound, triple-flow units with a heat rate of 9,216 Btu/kwhr. Both rotor and stator of the generator will be innercooled.

Detroit Edison Co's new 260-Mw units will be cross-compound, double flow units, according to W. W. Brown. The 3,600-rpm high-pressure unit has 60% of the capability; the 1,800-rpm low-pressure machine, 40%. Steam conditions will be 2,000 psi, 1,050F with 1,000F reheat, and a heat rate below 9,000 Btu/kwhr is anticipated.

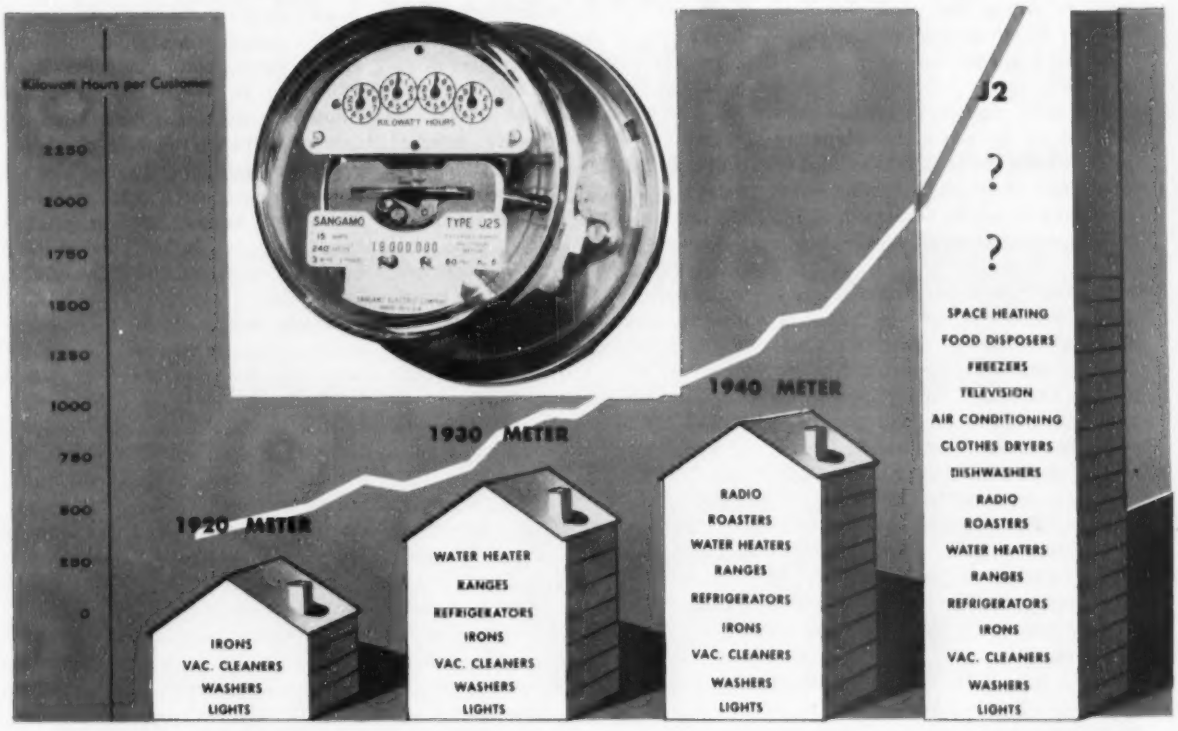
Gas Turbines Grow Too . . . Rehabilitation of a small steam plant by combining gas turbine and steam turbine cycles was described by Louis S. Gee, West Texas Utilities Co. The 5,000-kw gas turbine exhausts to a recuperator that boosts condensate temperature 122F. Overall plant efficiency was increased from 15.66 to 18.03%.

T. J. Putz, Westinghouse, described a 15,000-kw, 3,600-rpm gas turbine now being built. The high pressure turbine, compressor and electric generator, and the low-pressure turbine and compressor are on separate shafts. Full load efficiency will be 26.5%.

Boiler Trends . . . Controlled circulation boilers appear to be the best answer to the exceptionally large units now being considered, E. M. Powell, Combustion Engineering, said. Designs are in process for up to 5,000 psi at the throttle and 1,150F with 1,050 reheat and 1,050 secondary reheat.

Trends in Cyclone furnace boiler designs, said G. W. Kessler, Babcock & Wilcox Co, are toward: Simpler furnace arrangements, increased fur-

THE NEW SANGAMO TYPE J2



the watthour meter with EXTENDED RANGE

to measure the nation's growing power load . . .

The immense growth of residential power loads during the past thirty years is only an indication of the load growth of the future. Surveys on today's use of service entrance equipment indicate the electrical industry's awareness of the urgent need for adequate wiring.

Adequate *metering* will be needed, too. Accurate measurement of the loads of the future will require a watthour meter with straight line accuracy up to 100 amperes—a meter capable of handling all forseeable increases in average residential consumption. That's why Sangamo has developed the J2, a meter with reserve capacity fully adequate to meet future load growth.

The new Sangamo J2 will protect your investment in new meters by providing sufficient reserve capacity to meet any contingency of future load growth—sustained accuracy with minimum maintenance during its entire life—at *no increase in cost or price.*

Sangamo presents the new J2 with full confidence that this singlephase watthour meter—the finest in Sangamo history—will prove a much needed advance in meter design.

Get the facts . . . mail the coupon below for your copy of "Protect your Investment in New Meters." It's just off the press, and gives the complete story of the evolution of the Sangamo Type J2 . . . the Meter with reserve capacity for growing loads.

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nace capacities, use of a wider range of fuels, improved cleaning facilities, elimination of induced-draft fans with pressure firing, use of Cyclones to convert fly ash to slag, and the possibility of Cyclones for initial oil and gas firing.

Extensive markets have been developed for fly ash as an admixture in Portland cement. Still the rate of production of fly ash is growing faster than markets can be developed, C. M. Weinheimer, Detroit Edison, said.

Hydraulic Power Development . . . The significance of the Big Creek-San Joaquin Project of Southern California Edison Co, was described by W. L. Chadwick, vice president in charge of engineering and construction. The project was described as a model of private enterprise development of a multipurpose project.

The six Edison plants in this project total 530,000 kw. Output of 2.8 billion kwhr per year is about half the 5.4 billion kwhr from Hoover Dam.

In reviewing the role of the Corps of Engineers in water resource development, Brig Gen E. C. Itschner pointed out that multipurpose projects under construction in the Columbia Basin will have an installed capacity of 5.1 million kw when completed. Costs on these projects have been held to a minimum, he said. Cost per kw at Chief Joseph Dam will be under $180.

Electric Systems . . . Establishing service standards cuts confusion and controversy and probably means a more economical system, according to W. J. Lyman, Duquesne Light Co. Performance of the Pittsburgh system showed better than standard performance in number and duration of interruptions during a recent four-year test.

Two papers vigorously attacked problems created by conflicts between today's pyramiding loads and prevailing low utilization voltage standards. L. G. Smith, Consolidated Gas, Electric, Light & Power Co of Baltimore, said savings of $6 per kva for transformers, secondaries, and meter are possible with a 240/480 v system compared with 120/240. New voltage standards should be in the range of 240/416 to 277/480 if they are to be keyed to existing equipment voltages.

Concurring generally with Smith on the matter of higher secondary voltages, W. R. Bullard, Chase Hutchinson, and R. E. Pierce, Ebasco, said that distribution for the future may see still wider use of higher primary voltages to meet rapid system growth. Higher speed distribution circuit breakers are needed to overcome today's difficulties of fuse coordinating on high-capacity circuits where high-fault current and relatively slow breakers complicate the problem, they said.

Although aerial cable for distribution costs 2.28 times open wire on a per-mile-installed cost basis, F. C. Van Wormer and H. M. Bankus, GE, showed that its cost on a per kva basis is only 3 to 12% higher when comparison is made on a load area coverage basis. (EW, Feb. 22, p 98).

Aluminum sheath aerial and underground cables are almost within reach today. Although lead and aluminum sheath cables cost about the same today, K. D. Wyatt, Phelps Dodge Copper Products Co, said introduction of extrusion method of sheath production can bring startling cost reductions. Such aerial cable would be 20 to 70% lighter, labor of installation could be halved, and lighter messenger wires and hardware would be possible.

Drastic reduction in transformer sound level can only be obtained by lower core induction. However, Westinghouse designers L. B. Rademacher and T. R. Specht said that installed cost for a given sound level can be reduced by using barriers and standard transformers. About a 10-db reduction in level can be had with a four-sided enclosure.

Breakers No Bottleneck . . . Assurance that switchgear need impose no limitation on growth of power systems in the immediate future was given by R. M. Bennett, GE. But he cautioned the industry against developing a breaker for 400 kv only to find that it needed one for 440 kv. Utilities would be better served at lower cost if the 440-kv breaker were developed first and then modified for 400 kv, he declared.

Closer control of radio interference for high voltage equipment has been brought about by television, A. W. Hill, Westinghouse, said. Recent circuit breaker studies show radio influence voltages of 330-kv condenser bushings are less than 100 microvolts with 110% line to ground voltage applied.

Developments in standardized 2.4-13.8-kv, metal-clad swithgear for ring-bus distribution substations are again focusing the interest of engineers on the reliability features of the ring-bus arrangement, according to D. Dalasta, Allis-Chalmers.

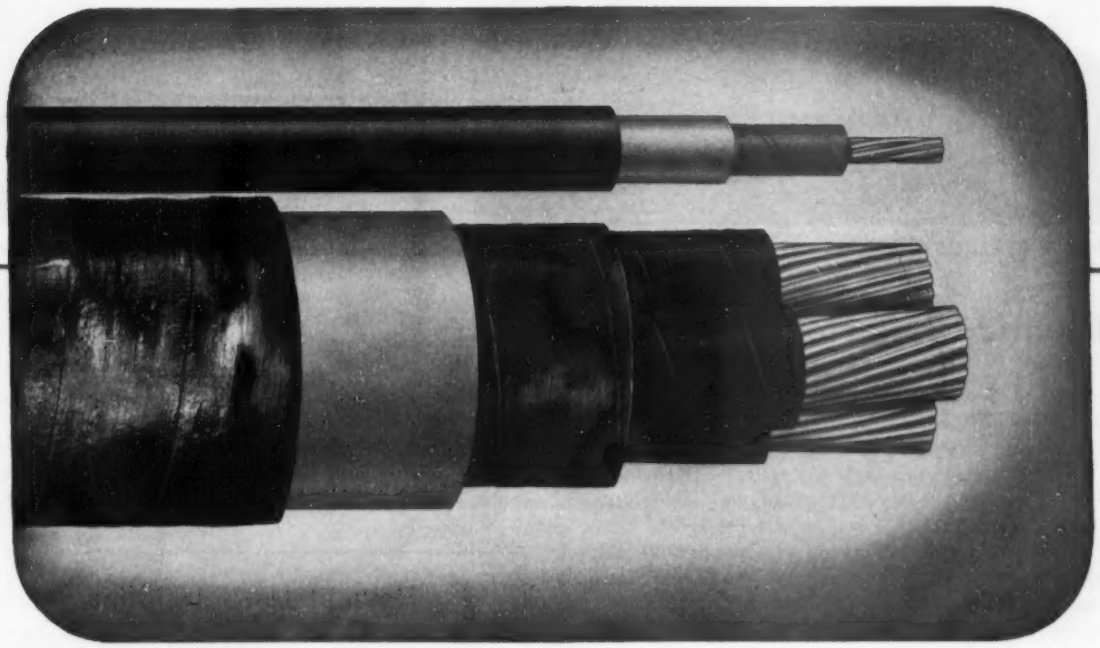
A new low oil-content, 230-kv, 10 million-kva circuit breaker was described by Paul Wildi, Pacific Oerlikon Co.

Improvement in high-voltage air-blast breaker design has resulted in elimination of the isolator which was present in early designs and which presented design problems, Hans Meyer, Brown Boveri & Co, told the conference.

H. P. Sedwick, executive vicepresident, Commonwealth Edison Co; Elgin B. Robertson, president, AIEE and Jerome K. Kuykendall, chairman, Federal Power Commission

ROEBLING PROTECTIVE COVERINGS ON LEAD SHEATHED CABLE

for utilities, chemical plants and the petroleum industry



LEAD SHEATHED CABLES used in certain applications by public and private utilities, chemical plants and the petroleum industry are often impaired by electrolysis or chemical corrosion. But such corrosive action can be effectively reduced, and cable life extended, by using Roebling Paper Insulated and Varnished Cambric Cables with either of two outer protective coverings.

One of these coverings is an extruded thermoplastic sheath employing a special high-molecular weight polyethylene. The other is ROESHEATH, built up of neoprene and neoprene-filled fabric tapes and vulcanized directly over the lead sheath. Both coverings not only provide essential protection, but, in some cases, may permit the thickness of the lead sheath to be reduced.

For longer, more dependable cable life and worthwhile economy write for full information... and get our recommendations for solving any special problem.

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ROEBLING

TWO GLASS PANELS in each office keep temperatures there at 75F

Close temperature control is maintained in laboratory

Electric Units Heat Lab and Offices

Lack of fire protection and minimum fire hazard were given as chief reasons for installation of electric heating at the Indiana Artificial Breeders' Association farm on the Indianapolis Power & Light Co system. The glass panel radiant heaters, installed in offices and laboratory and shipping room total 19½ kw, see box.

There are two conventional glass panel units in each of three offices; two, two-element, Direct-O-Ray units in the laboratory and one, two-element Direct-O-Ray unit above the deep-freeze.

Normally, thermostats are set at 75F. For two hours in the morning the laboratory is kept at 85 to 90F.

Operators said that flexibility required by this type of operation, with different temperatures in different areas, was another reason for selecting electric heating. Other reasons were that facilities were spread out, making other types of heating difficult. Still they were crowded for space and the electric units required minimum space. When all considerations were weighed, electric heating was the only thing that filled the bill.

Operators of the farm have been enthusiastic about the electric heating and said that costs are quite reasonable.

Heating Units Installed

			Total
Lab	2	1500 W Direct-O-Ray	3,000
Shipping Room	6	1500 W Direct-O-Ray	9,000
Men's Room	1	1000 W Wall Panel	1,000
Women's Room	1	750 W Wall Panel	750
Office	2	1000 W Wall Panel	2,000
Office	2	1000 W Wall Panel	2,000
Office	2	1000 W Wall Panel	2,000

Demonstrations Feature Home Lighting Campaign

Union Electric's home lighting campaign slogan "For Better Sight . . . Redecorate With Light" raised the problem of how best to give a visual demonstration of redecorating a room without expensive changes of furniture, painting or paper hanging.

To answer the question the company's residential sales department has provided a small and compact lighting booth equipped with a large variety of lighting fixtures

COMPACT LIGHTING BOOTH is equipped to demonstrate a variety of lighting fixtures and lamps

and lamps, a built-in light meter, and an easy-to-operate rheostat to control the amount of light.

The booth works on the basis of letting the customer make his own choice as to the type of light he needs. A page from a telephone book is laid on the floor of the booth. Then the customer is allowed to control the amount of light from a simple frosted bulb until he decides sufficient light is available to be adequate for reading the page from the telephone book. From this amount of light a reading is made on the light meter, which is calibrated to show whether or not the light is sufficient for various activities.

The salesman then goes to work demonstrating exactly how lamps, adapters, and fixtures can be used to remove glare and gloom from the home by use of light conditioning. Varous types of valance lighting, shades, lamps and fixtures line the walls of the booth. All are controlled by a series of light switches enabling the salesman to produce practically any type of light and shade combination imaginable that customers would want.

Union Electric has also taken into consideration the fact that some of their customers may not own their homes and will be limited as to the amount and type of light conditioning they may wish to do. The booth is set up to show how such simple things as different types of bulbs or shades can result in a tremendous difference in the appearance of any room in the house. The booth is also equipped with a complete stock of adapters, bulbs, lamps, and shades to meet practically any request from a customer desiring to improve the lighting in her home.

Union Electric's lighting campaign, in addition to the booth, included radio, television, new literature, and a newspaper advertising campaign using more than 25,000 lines of space in St. Louis and outlying areas of its service territory.

Illustrated Booklet Sells Street Lighting

J. HOMER SHAW, Commercial Director, Business Development Dept, Utah Power & Light Co, Salt Lake City

Pictorial booklet depicting good street lighting is being used by the Utah Power & Light Co to promote its community lighting program. Titled "More Light on Your Streets", the 28-page booklet illustrates the results of street lighting projects already completed in communities over the company's system. The booklets are distributed to state, county and city officials and civic leaders throughout the service area which includes a small section of southern Idaho and western Colorado.

Working in cooperation with local officials, the Utah utility and its subsidiary, Western Colorado Power Co, have installed 1,200 new street lamps in 20 cities and towns. These gains have been made since the present long-range lighting program was inaugurated about four years ago.

Since publication of the booklet in February, 1953, Utah P&L has installed 580 mercury vapor lamps rated 20,000 lumens in five Utah cities: Salt Lake City, 448; Ogden, 42; Clearfield, 64; Moab, 17; and Green River, 9. In Idaho, 51 lamps have been installed in two towns. The company also has signed contracts for installation during 1954 of 191 mercury vapor lamps in Ogden and Layton, Utah, and 10 lamps in Menan, Idaho. This record is evidence of the selling effect of the booklet.

NEW STREET LIGHTING is contrasted with old on the cover of a promotional booklet put out by Utah Power & Light Co. D. H. White, left, and the author examine the booklet

The booklet contains pictures of streets in company-served communities after installation of new street lights. Under each picture is a short description of the lighting. The data covers number, size and type of lamps, type of luminaire, pole and bracket specifications, and population of the town. The companies' new street-lighting promotional policy is stated on the inside front cover. The inside back cover lists street lighting projects contracted for installation in 1953. The back cover lists seven benefits of good street lighting.

Smallest town mentioned in the booklet is Weston, Idaho, with a population of 382. Twelve 4,000-lumen incandescent lamps were installed on the main street. The largest installation shown in the booklet is that of 151 20,000-lumen mercury-vapor lamps on Salt Lake Blvd, Salt Lake City.

Machine Washes Luminous Ceilings

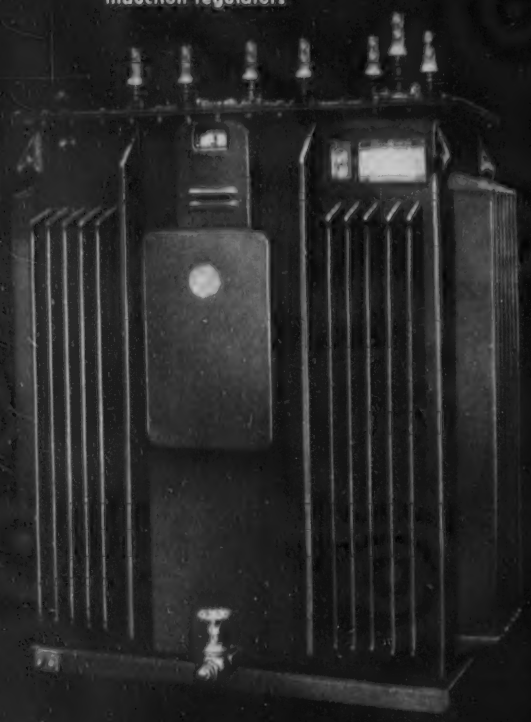
For maintenance of lighting efficiency, luminous ceilings should be kept clean. Washing the plastic panels or sheets by hand is quite a chore. To speed up the cleaning job, Luminous Ceilings, Inc, has developed a washing machine for the corrugated plastic which is a component of its product.

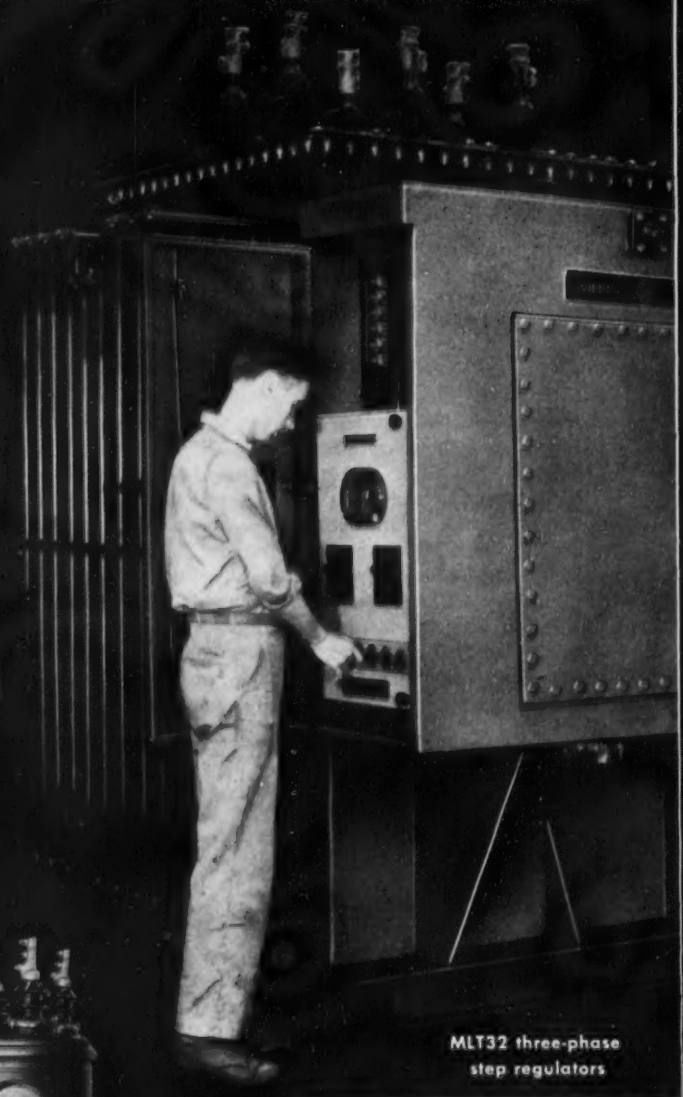
Sections up to 25 feet long can be run through the machine. First operation of the machine is wash and scrub, in a detergent solution held thermostatically at 100 deg F, then comes a cold water rinse, followed by immersion in a wax solution to destaticize the plastic. The sections can then be replaced in the ceiling.

FEEDER VOLTAGE REGULATORS

a complete line of both step and induction

IRT three-phase
induction regulators





MLT32 three-phase
step regulators

IRS single-phase
induction regulators

ML32 single-phase
step regulators

ADVANTAGE OF CLASS 1 ACCURACY is illustrated in diagrams at right which show how a reduction in *effective* bandwidth permits a greater voltage drop in primary, transformer, and secondary while maintaining the same voltage standards from first to last consumer.

regulators with the economy of

Class 1 Accuracy at no extra cost

Whatever your voltage problem, you'll find a dependable, low-cost solution in this complete line of General Electric feeder voltage regulators.

G-E Induction Regulators, available for circuits up to 15 kv and 3000 kva, provide smooth, stepless control and need virtually no maintenance. For close regulation of single-phase feeders where operations are frequent and immediate voltage correction is required, G-E Type IRS single-phase induction voltage regulators offer the finest regulation obtainable. Their rugged operating mechanism and the elimination of switching contacts give you a maintenance record unbeaten anywhere. Type IRT three-phase induction regulators offer the same advantages of rugged construction, long life, and negligible maintenance.

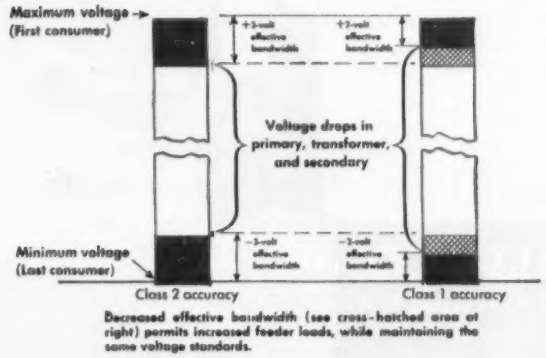
G-E Step Regulators assure dependable and economical regulation where you handle large blocks of power, and where you need supplementary regulation on your branch and rural feeders. For three-phase circuits, station-type MLT32 regulators adjust voltage in thirty-two 5/8% steps (Best suited for lines with balanced loads). They feature accessibility and ease of maintenance of switching mechanism. G-E Type ML32 single-phase step regulators also adjust voltage in thirty-two 5/8% steps, and give low-cost, dependable regulation on branch and rural circuits.

Class 1 Accuracy, the highest accuracy classification defined by ASA Standards, is a standard feature on *all* G-E voltage regulators. When compared with regulators with Class 2 or Class 5 accuracy, the G-E regulator with Class 1 accuracy permits (1) greater feeder length at the same load density, (2) greater load on existing feeders, or (3) higher voltage standards on existing feeders. Insist on Class 1 Accuracy controls. They mean *dollars* in your pocket with not one additional *cent* in investment.

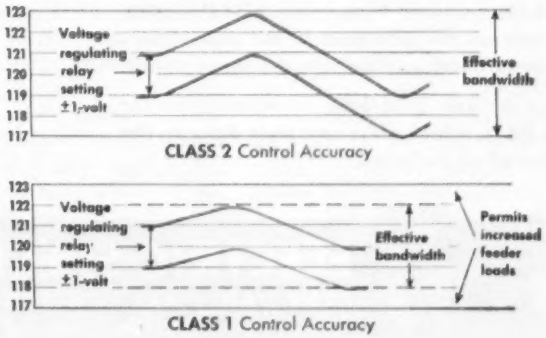
For More Information about G-E voltage regulators, contact your nearest G-E Apparatus Sales Office or authorized agent. Or write Section 423–4, General Electric Company, Schenectady 5, New York.

Progress is our most important product

GENERAL ELECTRIC



Decreased effective bandwidth (see cross-hatched area at right) permits increased feeder loads, while maintaining the same voltage standards.



INSTALL G & W OIL SWITCHES *Overhead*
FOR FULL LOAD BREAK SECTIONALIZING

SWITCHING CONTACTS IN OIL FOR PROTECTION AGAINST CORROSION

"ORA" Single Throw — "ORAD" Double Throw

"ORA" OIL SWITCHES

Recommended for full load-break sectionalizing of overhead circuits where protection against atmospheric corrosion and bad weather conditions is important. Switch links and floating contacts (standard Type "RA") oil-immersed mean permanent trouble-free operation.

The angle location of porcelain outlet bushings facilitates making the line connections from above or below. Solderless clamp lugs are included. The steel tanks are usually arranged for hanging from double cross arms, with the operating lever on the side next to the pole. Operation from ground level adds to the convenience.

Write us or ask your local representative for Bulletin DB51, which gives complete data on the "RA" line of oil switches.

G & W ELECTRIC SPECIALTY CO.
7780 DANTE AVE., CHICAGO 19, ILL., U.S.A.
Cable terminating, connecting and sectionalizing devices
Representatives in principal cities of U. S. A. In Canada—Powerlite Devices Ltd. Toronto and Montreal

MANUFACTURERS AND MARKETS

Metals Prop

Administration's decision to expand stockpiling program bolsters lead and zinc markets

Sagging metal markets—mainly lead and zinc—have been bolstered by the Administration's decision to use the strategic stockpile as a prop for domestic mining. In the wake of the White House's announcement two weeks ago, lead has climbed from 13¢ to 13¾¢, and zinc from 9¾¢ to 10¼¢.

The White House announcement was spurred by a preliminary recommendation of the President's Inter-Agency Mineral Policy Committee.

Import Restrictions Pushed . . . The assignment has been a delicate one. Domestic miners have been pushing for new important restrictions on lead, zinc, and other metals. But the Administration is standing firm on the tariff issue, and has come up with increased stockpiling as an aid to the industry.

Actually, the Administration plays down the new stockpile policy as an economic prop for mining; rather it carefully defines it as a defense measure.

In defining the new policy the Administration used this reasoning:

When the stockpile program began, objectives were set by subtracting (1) estimates of military and essential civilian requirements for a five-year war from (2) projected output and imports. But the rate of domestic production, particularly in lead and zinc, has declined below projected levels, so the need for expanded stockpiling.

The full report of the President's Mineral Policy Committee is due out in about two weeks.

Britain's 1st Big Transformer for U.S.

The 230-kv unit shown being hoisted aboard ship recently at Liverpool, England, is the first big high voltage transformer ever to be manufactured in Great Britain for the United States. Manufactured at the English Electric Co, Ltd, Stafford Works for the Bureau of Reclamation, the unit is now on its way to California where it will be installed at the Folsom Dam.

Buy American Preferences Weakened by Ike's Policy

Buy American preferences for U. S. bidders on government contracts will be weakened under the foreign economic policy outlined by the President this week. That means stiffer foreign competition on government jobs for American heavy electrical equipment manufacturers.

The Administration won't lower Buy American protection as much as the Randall Commission recommended though. The commission urged amending the law to wave discrimination against foreign bidders whose governments didn't discriminate against American bidders. The Administration will submit legislation to this effect to Congress but action is unlikely this year.

Key question is how Buy American will be administered pending amendment by Congress. The Randall Commission called in effect for scrapping the price differential favoring American bidders by administrative action. The President indicated that the traditional 25% differential no longer would be automatically applied. But it hasn't been decided yet what differential will be used. The President promised special treatment for American bidders where national security, small business interests, or chronic unemployment are involved.

The Buy American Act is scheduled to expire June 12, unless legislative action is taken.

GE, Westinghouse Pass On Excise Reductions

The new $999 million excise tax reduction bill that went into effect April 1 has brought about price cuts in certain household appliances.

Westinghouse Electric Corp and General Electric Co have announced that they would pass excise tax cuts on appliances along to their customers in full.

Here are some price cuts made by Westinghouse: A refrigerator which sold at $279.95 will now be priced at $268.23. Price reductions on other refrigerators vary from $8.32 to $22.95, and on electric ranges from $8.34 to $20.78. The company said other appliances affected include: Home freezers, dishwashers, clothes dryers, water heaters, food waste disposers, dehumidifiers, domestic fans and electric housewares.

For small appliances, GE plans to cut coffee makers from $29.95 to $29.50; toaster-grill Model G-40, $16.95 to $16.50; toaster, $23.95 to $21.95; waffle-grill combination,

$22.95 to $22.50; and portable mixer, $19.95 to $19.50. For major appliances, GE's new price range for refrigerators is from $210.48 to $525.96. For example, a refrigerator formerly priced at $549.95 will now sell for $525.96. New price range for ranges is from $191.33 to $478.09. One formerly sold at $499.95 is available now at $478.09. GE's freezers and dryers are also affected by the excise tax cut.

The new tax law calls for manufacturers' excise tax on appliances to be cut from 10% to 5%.

Regulator on 'Trial Basis'

Allis-Chalmers Manufacturing Co plans to launch on May 1 a new merchandising technique for the major electrical equipment industry. A-C will deliver upon request a JFR (pole-type) distribution regulator for a 30-day inspection without cost to any recognized distribution system. The firm said we are making the offer because "we know there are a great many distribution systems that have not yet investigated distribution type regulators."

To Make Power Capacitors

Plans to manufacture power factor correction capacitors have been announced by Sangamo Electric Co, Springfield, Ill., manufacturer of watt-hour meters. Sangamo, also a supplier of mica, electrolytic, and paper capacitors to the electronic industry, will handle sales through its utility sales organization at Springfield, while manufacture of the new capacitors will be at the Marion, Ill., plant. Actual production is not expected for about a year.

MANUFACTURING BRIEFS

New Plants . . . General Electric Co has broken ground at Waynesboro, Va., for its new multi-million-dollar speciality control plant. To be located on a 101-acre tract, the plant, which will manufacture electronic controls for industrial and aviation use, will contain approximately 200,000 sq ft . . . **Westinghouse Electric Corp** expects to break ground in May for construction of its new multi-million-dollar metals plant at Blairsville, Pa. Main purpose of the new plant will be to bridge the gap between research and the commercial application of metals in the electrical industry.

Kerite Co, New York, manufacturer of wire and cable, highlights its 100th anniversary in recently released annual report for 1953.

Two East Pittsburgh plant workers have been dismissed by Westinghouse Electric Corp. The employees, Thomas J. Fitzpatrick and Frank Panzino, were charged with having a long history of Communist connections. They had been active in Local 601 of UEW, which was supplanted by IUE (CIO) as bargaining agent for employees at the plant. Spokesman for Local 601, IUE, said the union is filing a grievance on the dismissals with Westinghouse.

SALES ASSIGNMENTS

COMPANY STAFFS

Thomas & Betts Co, Elizabeth, N. J., has named the following divisional managers to head up and manage regional field sales organizations: Karl G. Kempf, Pacific Coast Division; H. C. Moses, Jr, Western Division; and C. A. Biddulph, Eastern Division.

MANUFACTURERS' EARNINGS

Company	Period Months	Ended	Net Income 1953	Net Income 1952	Earnings Per Common Share 1953	Earnings Per Common Share 1952
Allis-Chalmers Mfg	12	Dec.	$21,943,569(a)	$24,457,855	$6.58	$7.98
Blaw-Knox	12	Dec.	4,137,528	4,189,204	2.93(b)	2.97
Combustion Engineering	12	Dec.	7,360,789	5,935,000	7.61	6.15
I-T-E Circuit Breaker	12	Dec.	2,124,431	2,620,429	3.11(c)	8.44(f)
Kiddie (Walter)	12	Dec.	1,031,814	1,120,381	4.92	5.36
Permutit	12	Dec.	721,007(h)	868,800(h)	3.28	3.95
Remington Arms	12	Dec.	6,019,095	6,011,033	.78	.78
Reynolds Metals	12	Dec.	18,320,975	14,731,071	10.15	8.12(i)
Sprague Electric	12	Dec.	2,888,281	3,136,853	3.75	4.18
Weston Electrical Instrument	12	Dec.	1,025,930	930,372	2.40	2.17(i)

Notes—(a) Includes $1,170,850 prior years' tax adjustment credit; (b) Based on 1,411,468 shares outstanding before 2½% stock dividend paid on December 16, 1953; (c) Based on average number of shares outstanding during the period; (f) Based on shares outstanding at close of period; (h) After provision for contingencies of $35,000; (i) Based on shares now outstanding.

MEETINGS CALENDAR

Illuminating Engineering Society
Southwestern Regional Conference, Rice Hotel, Houston, Tex., April 11-14; Inter-Mountain Regional Conference, Denver, Colo., April 15-16; South Pacific Coast Regional Meeting, Museum of Art, San Francisco, April 19-20; Pacific Northwest Regional Meeting, Benjamin Franklin Hotel, Seattle, Wash., April 22-23; Canadian Regional Meeting, King Edward Hotel, Toronto, Ont., April 28-30.

Edison Electric Institute
EEI-AGA Accounting Conference, Hotel Statler, Boston, April 12-14; Industrial Relations Committee, Netherlands Plaza Hotel, Cincinnati, Ohio, April 15; Conference of Public Utility Fleet Operators, Sponsored Jointly by EEI Transportation Committee and AGA Automotive-Mobile Equipment Committee, Mount Royal Hotel, Montreal, Que., April 20-23; 22nd Annual Convention, Atlantic City, N. J., June 1-4.

Northwest Electric Light & Power Association
Engineering and Operation Sections, Olympic Hotel, Seattle, Wash., April 15-17.

American Institute of Electrical Engineers
Conference on Feedback Control, Claridge Hotel, Atlantic City, N. J., April 22-23; Summer General and Pacific General Meeting, Hotel Biltmore, Los Angeles, June 21-25.

A. & M. College of Texas
7th Annual Conference for Protective Relay Engineers Department of Electrical Engineering, College Station, Tex., April 26-28.

National Association of Electric Companies
Annual Meeting, Mayflower Hotel, Washington, D. C., April 29.

American Public Power Association
Annual Meeting, Hotel Morrison, Chicago, May 4-6.

Pennsylvania Electric Association
Joint Spring Meeting of Relay Committee and Systems Operation Committee, Bedford Springs Hotel, Bedford Springs, Pa., May 6-7; System Planning Committee, Hotel Hershey, Hershey, Pa., May 10-11; Transmission and Distribution Committee, Fort Bedford Inn, Bedford, Pa., May 13-14.

Southeastern Electric Exchange
Spring Meeting, Engineering and Operation Section, Sans Souci Hotel, Miami Beach, Fla., May 6-7.

Public Utilities Advertising Association
National Convention, Hotel Statler, Boston, May 13-14.

Pacific Coast Electrical Association
Annual Convention, Hotel Del Coronado, Coronado, Calif., May 19-21.

Northwest Public Power Association
Engineering and Operation Section, Benjamin Franklin Hotel, Seattle, Wash., May 20-21.

National Association of Electrical Distributors
Annual Convention, Atlantic City, N. J., June 6-11; Pacific Zone Convention, Mark Hopkins Hotel, San Francisco, Oct. 4-7.

American Society of Mechanical Engineers
Semi-Annual Meeting, William Penn Hotel, Pittsburgh, June 20-24; Fall Meeting, Schroeder Hotel, Milwaukee, Wis., Sept. 8-10.

* **Nuclear Engineering Conference**
Sponsored by American Institute of Chemical Engineers, University of Michigan, Ann Arbor, Mich., June 20-26.

World Power Conference
Sectional Meeting, Rio de Janeiro, Brazil, July 25-Aug. 10.

Pan-American Federation of Engineering Societies
(UPADI), Third Convention, Sao Paulo, Brazil, Aug. 2-12.

*Addition this week.

Chemical absorption towers of all-porcelain construction have been produced by Lapp in smaller sizes for many years, and have won, in the chemical industry, recognition for their long life, freedom from corrosion attack, and purity of output.

Recently developed techniques (which, incidentally, are responsible for some spectacular electrical pieces, too) are permitting production of much larger pieces, of which the section pictured is a sample. 26″ inside diameter (with a wall thickness of 1¼″), it is set up in a stack of four, which, with required dome and inlet sections, makes an all-porcelain tower 24½ ft. high.

Interesting as this is as a ceramic achievement, merely from a size standpoint, the most impressive feature of the assembly is that porcelain pieces are all finished to fit together for high-vacuum operation of the tower *without gaskets!*

This is accomplished by grinding, lapping and polishing of all porcelain bearing surfaces to true optical precision, involving Newton's Rings testing with an optical flat.

It is obvious that only porcelain of highest quality is suitable for such precision work. No blebs, pore spaces or internal imperfections can mar the surfaces. Optical polish requires a hard uniform surface.

Other interesting design features (for all of which Lapp assumes full responsibility) include the cemented-on ring flanges, and bolting-together arrangement, which permits heating up of the tower without damage to itself—and insulation jacketing, including steam-heating coils to maintain proper operating temperatures.

We're proud of this demonstration of the ability and facility of Lapp to design and build porcelain-and-metal assemblies to accomplish specific objectives. But more important is the assurance to you, in the specification of Lapp insulators . . . or Lapp components for electrical equipment . . . of operating security . . . long life . . . low upkeep.

Lapp Insulator Co., Inc., Le Roy, N. Y.

Lapp

NRECA Praises Georgia PSC

Co-op association commends Southern group for handling accelerated amortization work while condemning 20 commissions

The National Rural Electric Cooperative Association recently commended the Georgia Public Service Commission for its handling of accounting procedures in connection with accelerated amortization on a number of Georgia Power Co projects.

Twenty PSC's Condemned . . . The Georgia PSC Chairman Matt L. McWhorter said that he had received a copy of the resolution (see below) commending the Georgia commission but "condemning the decision of the 20 other state utility regulatory commissions" on this subject.

The federal government has approved $42,573,542 in rapid amortization for Georgia Power Co projects. For the company, this will result in a saving in federal income taxes of approximately $19.5 million for the five-year period.

Tax Deferment . . . In its order to the company, the PSC has taken the position that such a transaction was a tax deferment rather than an outright tax relief. Therefore, the commission ordered the company to credit to a reserve fund the full amount of the temporary tax reductions. This reserve fund can be used later as an offset to the higher taxes which will follow the five-year period of accelerated amortization.

The commission also stated that this reserve, arising as it does, from interest refunds be deducted from the company's plant account in arriving at the rate base.

NRECA Resolution commends Georgia PSC for . . .

Its decision to protect electric consumer

NRECA Resolution condemns 20 PSC's because . . .

Their decisions are at electric consumers' expense

"WHEREAS, the Federal accelerated tax amortization program has, in effect, resulted in interest-free loans to commercial power companies exceeding $800 million with ultimate benefits flowing to these companies, in excess of $2.8 billion, and

"WHEREAS, the ultimate total benefits to the utility companies exceed the total cost of all federal power facilities or all Rural Electrification Administration loans, both of which are repayable to the Treasury with interest,

"NOW THEREFORE BE IT RESOLVED that we commend this information to the attention of Members of Congress, state utility regulatory bodies, and to all of our members, in order that the information may be appropriately utilized to procure lower wholesale power rates, which such utility benefits should permit, and to counter and offset utility company statements and campaigns that insinuate our members' benefit from subsidies, while commercial companies allegedly pay their own way without any form of Government aid.

"BE IT FURTHER RESOLVED, that we commend the Georgia Public Service Commission on its decision on the handling of accelerated amortization certificates because its decision protects the electric consumer; and

"BE IT FURTHER RESOLVED, that we condemn the decisions of the 20 other state utility regulatory commissions, and the recent decision of the Federal Power Commission as leading to unwarranted and unjust subsidies to private utility investors at the expense of electric consumers."

FINANCIAL BRIEFS

New York State Electric & Gas Corp has sold 50,000 shares of 4.15% cumulative $100 par preferred stock to 17 institutions through the First Boston Corp . . . **Central Maine Power Co** has arranged to sell 50,000 shares of 4.75% cumulative preferred stock to institutions through Harriman, Ripley & Co, Inc.

Wisconsin Power & Light Co is planning to spend about $17 million during 1954 for construction, but plans no permanent public financing during the year, Pres Grover Neff said in company's 1953 annual report, just released.

Columbus & Southern Ohio Electric Co is planning to spend $23.1 million for construction in 1954 of which $10.2 million will be additions to plant.

Toledo Edison Co stockholders will vote on April 20 whether or not to increase authorized preferred shares to 500,000 from 300,000 . . . **Indianapolis Power & Light Co** stockholders will also vote on April 20 whether or not to increase the authorized common stock to 5 million shares from 2 million shares.

Kansas City Power & Light Co stockholders will be asked on April 27 to approve the issuance of $16 million in first mortgage bonds to be sold later in the year and increase the authorized preferred stock to 596,800 shares from 346,800 shares.

Electric Energy, Inc, has placed $65 million 3¾% first mortgage sinking fund bonds due 1982, and $30 million 4½% first mortgage sinking fund bonds due 1979 through Kuhn, Loeb & Co.

Montana Power Co's Pres J. E. Corette told the New York Society of Secu ity Analysts recently that earnings per share for 1954 are estimated to be around $2.62 earned in 1953. He further said that the 1954 earnings could be larger if a legally contested gas rate increase comes through.

Around $1 million in "new money" will be needed by St. Joseph Light &

Power Co, Pres C. A. Semrad has estimated. He said it will probably be either a bond sale or bank loans.

Proposed Financing in June-July . . . Delaware Power & Light Co is planning to sell $10 million in first mortgage bonds on June 1; Jersey Central Power & Light Co, $6 million in first mortgage bonds on June 15; Florida Power & Light Co, $15 million first mortgage bonds sometime in June; and Connecticut Light & Power Co, $5 million in preferred stock and 600,000 shares of common stock sometime in July.

Wisconsin Public Service Corp shareholders subscribed for 95% of the 316,867 common shares offered on a 1-for-7 basis at $18.40 a share. After allotment of shares for employees' subscriptions, balance of 8,836 shares was offered for sale by an underwriting syndicate headed by First Boston Corp.

"Effects of a Depression on a Utility" is the title of an article in the February issue of "The Analyst Journal" by Sherman M. Hall of the Consolidated Edison Co of New York. He said: "I do not want to be counted among those who 'talk themselves into a depression.' I really do not believe that a man-sized depression exists in the foreseeable future. I do not even expect a 10 percenter."

Washington Water Power Co expects to earn $1.85 a common share in 1954 and more than $2 in 1955 as compared with $1.77 in 1953, Pres Kinsey M. Robinson told the New York Society of Security Analysts recently.

Philadelphia Electric Co will pay June 30 a quarterly common stock dividend of 45¢ a share as compared with 40¢ a share previously.

May Buy Puget Lines

The Kittitas County PUD of Ellensburg, Wash., is seriously considering purchase of Puget Sound Power & Light Co distribution lines in the county, according to H. A. Fleming, PUD manager. It was associated with other PUD's in an unsuccessful attempt to purchase the entire Puget Sound system last year. Puget Sound now serves some rural areas in the county.

Today in Utility Finance

YIELDS (%)

Quality	Bonds			Preferred Stocks			Common Stocks		
	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd
DATE 1954									
April 1	**2.83**	**2.86**	**3.15**	**3.91**	**4.03**	**4.40**	**4.81**	**5.14**	**5.40**
Mar. 25	2.82	2.87	3.14	3.88	4.09	4.42	4.83	5.19	5.42
END OF QTR.									
1st 1954	2.82	2.87	3.14	3.88	4.09	4.92	4.83	5.19	5.42
4th 1953	3.07	3.12	3.34	4.17	4.32	4.62	5.07	5.57	5.51
3rd 1953	3.30	3.33	3.54	4.35	4.52	4.83	5.36	5.97	6.01
2nd 1953	3.34	3.46	3.64	4.47	4.70	4.88	5.52	5.93	6.10

Date: Reis & Chandler, Inc.

EARNINGS

Company	Period Months Ended		Net Income 1954	Net Income 1953	Earnings Per Common Share 1954	Earnings Per Common Share 1953
Middle South Utilities, consolidated	12	Feb.	$14,228,888	$12,441,390	$2.00(a)	$1.87(a)
Texas Electric Service	12	Feb.	9,259,064	8,332,343	....	....
Texas Power & Light	12	Feb.	9,334,531	7,743,447	....	....
			1953	**1952**	**1953**	**1952**
Central Illinois Electric & Gas	12	Dec.	$1,885,246	$1,917,986	$2.07(b)	$2.32(b)
Central Power & Light	12	Dec.	5,682,344	4,692,840	....	....
Central & South West, consolidated	12	Dec.	15,621,000	13,562,000	1.72(c)	1.60(c)
Central Vermont Public Service	12	Dec.	963,708	958,884	.92(f)	1.07(f)
Consolidated Edison Co of New York	12	Dec.	49,578,554	45,115,034	2.94(g)	2.63(g)
Houston Lighting & Power	12	Dec.	10,311,738	8,846,537	1.99(h)	1.78(h)
Ohio Edison	12	Dec.	19,328,745	16,191,617	3.15(i)	2.97(i)
San Diego Gas & Electric	12	Dec.	4,627,428	4,581,208	1.16(j)	1.52(j)
Shawinigan Water & Power	12	Dec.	5,953,000	5,194,000	2.26	1.91
Southern California Edison	12	Dec.	21,872,010	23,970,515	2.56	3.21
Southern Co. consolidated	12	Dec.	22,369,897	20,232,110	1.23(k)	1.18(k)

Notes—Figures shown for the last eleven companies have been audited; (a) Based on 7,125,000 shares in 1954 and 6,650,000 shares in 1953; (b) Based on 774,400 shares in 1953 and 704,000 shares in 1952; (c) Based on 9,091,257 shares in 1953 and 8,485,173 shares in 1952; (f) Based on average number of shares outstanding during the year; (g) Based on shares outstanding at Dec. 31; (h) Based on 4,996,327 shares in 1953 and 4,753,209 shares in 1952; (i) Based on 5 278,306 shares in 1953 and 4,798,460 shares in 1952; (j) Based on 3,200,000 shares in 1953 and 2,400,000 shares in 1952; and (k) Based on 18,087,643 shares in 1953 and 17,080,659 shares in 1952.

FINANCING

Company and Description	Amount of Offering (000)	Offering Price	Yield to Public
WEEK OF APRIL 1-7			
Bonds			
Georgia Power—1st mtg 3⅛% due 1984	$11,000	101.467%	3.05%
Community Public Service—1st mtg 3¼% due 1984	3,000	101.93	3.15
Common Stock			
Public Service Co of New Mexico—138,656 shares (being offered commonholders on 1-for-10 basis, record April 1 to expire April 27)	$1,560	$11.25	6.04%
Pennsylvania Power & Light—704,917 shares (being offered commonholders on a 1-for-7 basis, record April 2 to expire April 19)	28,020	39.75	6.04
SCHEDULE FOR APRIL—MAY			
Bonds and Debentures			**Bid Date**
Central Power & Light—1st mtg due 1984	$18,000	.....	April 12
Southern Indiana Gas & Electric—1st mtg due 1984	8,000	.....	April 13
Ohio Power—1st mtg	20,000	.....	April 14
Los Angeles Department of Water & Power—electric plant revenues due 1955-84	15,000	.....	April 14
West Penn Power—1st mtg due 1984	12,000	.....	April 20
Commonwealth Edison—1st mtg due 1984	50,000	.....	April 27
Utah Power & Light—1st mtg due 1984	15,000	.....	April 28
Montana Power—1st mtg due 1984	6,000	.....	May 4
Wisconsin Electric Power—1st mtg due 1984	20,000	.....	May 4
Cleveland Electric Illuminating—1st mtg due 1989	20,000	.....	May 4
Consolidated Edison Co of N. Y.—1st mtg due 1984	50,000	.....	May 11
Montana Power—debs due 1979	18,000	.....	May 12
Virginia Electric & Power—1st mtg due 1984	25,000	.....	May 18
Public Service Electric & Gas—1st mtg due 1984	50,000	.....	May 26
Preferred Stock			
West Texas Utilities—60,000 sh cum $100 par	$6,000	.....	April 8
Long Island Lighting—200,000 sh $100 par	20,000	.....	April 13(a)
Ohio Power—50,000 sh $50 par	2,500	.....	April 14
Northern States Power (Minn.)—150,000 sh $100 par	15,000	.....	April 20
Arkansas Power & Light—70,000 sh $100 par	7,000	.....	April 20
Montana Power—60,000 sh no par	6,000	.....	May 4
Common Stock			
Florida Public Utilities—25,000 sh	.....	.....	April 8(b)
Texas Utilities—250,000 sh	.....	.....	April 13
Northern States Power (Minn.)—1,219,856 sh (to be offered commonholders on 1-for-10 basis, record April 15 to expire May 4)	.....	.....	April 14

Notes—(a) W. C. Langley & Co, Blyth & Co, First Boston Corp, underwriters; and (b) Starkweather & Co, heads syndicate.

Florida's Regulatory Policy . . .

. . . is outlined by Utilities Commission Counsel Petteway before meeting of New York Society of Security Analysts

Regulatory philosophy of the state of Florida was outlined recently by Lewis W. Petteway, general counsel of the Florida Railroad & Public Utilities Commission, before a meeting of the New York Society of Security Analysts.

Rates and Regulation Important . . . In his opening remarks, he said: "Investment bankers in New York have told me on numerous occasions that the most important of all criteria used in analyzing utility securities has come to be the rate climate and regulation."

As to the issuance of securities, Petteway said that the Florida commission has felt it was management's right and prerogative to dispose of its securities by whatever method it saw fit (whether by competitive bidding, negotiated sale, private placement or any other way) provided it was done in the most economical manner.

Regarding the rate base, the Florida counsel said, "In Florida, there are no statutory requirements concerning the rate base, except with reference to the regulation of gas and electric utilities."

Fundamentally, the 1951 state law says that it " . . . shall be the money honestly and prudently invested by the public utility company in such property used and useful in serving the public, less accrued depreciation, and shall not include any good-will or going-concern value or franchise value in excess of payment made therefor."

Year-End Rate Base Favored . . . With the Florida Power Corp rate case, the net average investment rate base which the commission has consistently embraced was abandoned in favor of the year-end rate base. Petteway stated that ". . . when rates are being fixed for the present and for a reasonable time in the future, investment figures already more than a year old may not be used with fairness to the utility . . ."

Petteway, in discussing the regulatory lag, went on to say ". . . if such losses incurred through the regulatory lag are further augmented by the adoption of an average investment rate base which coincides with an investment level more than a year old, the utility becomes the victim of confiscation, cannot successfully sell its securities . . ., and the public suffers because it cannot secure essential services."

Concerning determination of cash working capital, the commission, in the case of the Florida Power, allowed one-eighth of the company's maintenance and operating expenses and fuel costs plus prepayments. From it was subtracted certain customer advances, contributions in aid of construction, customer deposits and one-half of one-quarter of federal income tax accruals.

Working Capital . . . However, Petteway stated significantly: "Particular attention should be called to two of the items deducted from working capital. First, customer deposits are being returned by most utilities and will not long be available for use by the company. Second, recent changes in the method of paying corporate income taxes will eliminate these tax accruals from use as working capital.

"The Florida Power case is the only instance where the Florida commission deducted federal income tax accruals from the allowance for working capital and, as we have indicated, these funds probably will not be available for future use in this manner. The Florida Power case is also one of the few instances where a separate allowance was not made for materials and supplies. It was the opinion of the commission, on the basis of the record in that case, that the allowance for working capital was sufficient to cover the company's needs for materials and supplies. Separate allowances were made by the commission in two other important rate cases just before and immediately after the Florida Power order," the commission counsel said.

As to construction work in progress, completed but not transferred to the plant account, it is the policy of the commission, according to Petteway, to allow this item as well as such amounts on which no interest has been capitalized. In addition, under certain specified conditions, plant held for future use is allowed in the rate base.

Account 100.5 in Rate Base . . . Referring to the inclusion of Account 100.5 in the rate base, the commission disallowed it in the Florida Power case on the grounds that it ". . . was not particularly important in that case and that the utility had failed to justify its inclusion in the rate base."

Petteway stated, however, that ". . . the commission's views with reference to this item had not sufficiently jelled at that time to justify the establishment of a precedent which might be troublesome in the future. The question is still open for consideration and determination in a proper case. It is my own personal view that the inclusion of this item, on a proper showing, may find support in certain language in the 1951 law relating to value for rate making."

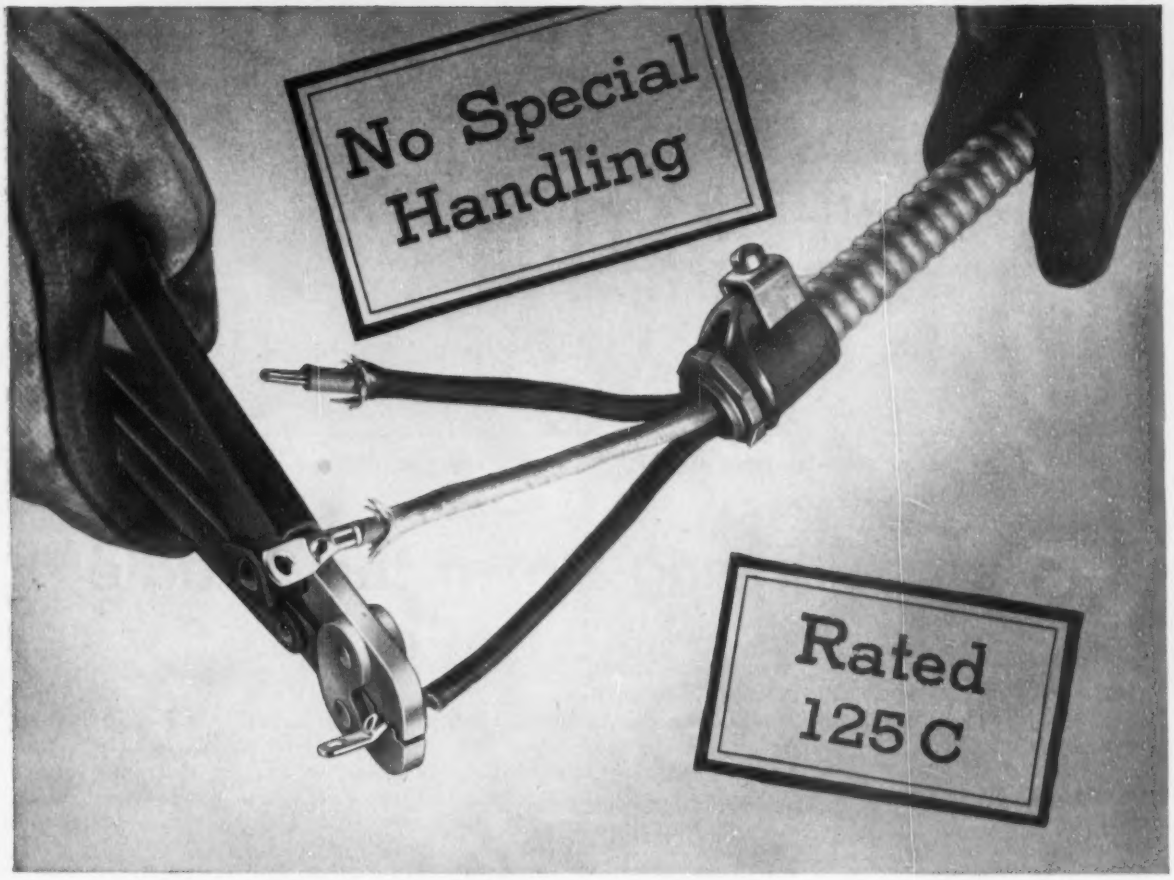
On reproduction cost new, the Florida counsel felt that in view of the rapid growth of utilities in Florida this item of value was of little practical importance.

For the rate of return, this varied from 6.12% for Southern Bell Telephone & Telegraph Co to 8% for a small independent telephone company. In July, 1953, the commission allowed a return of 6.45% in the case of Florida Power.

With regard to automatic adjustment clauses, Petteway appeared to be in favor not only of fuel adjustment clauses which are currently employed in many jurisdictions, but also of commodity adjustment clauses provided they are indicative of the price fluctuations entering into the utility's operating costs.

In addition, he suggested that because of the high proportion of labor costs in a telephone company's operations, automatic labor adjustment clauses be introduced in order to protect both the company and the subscribers.

Several recent PUC's decisions were included in the presentation.



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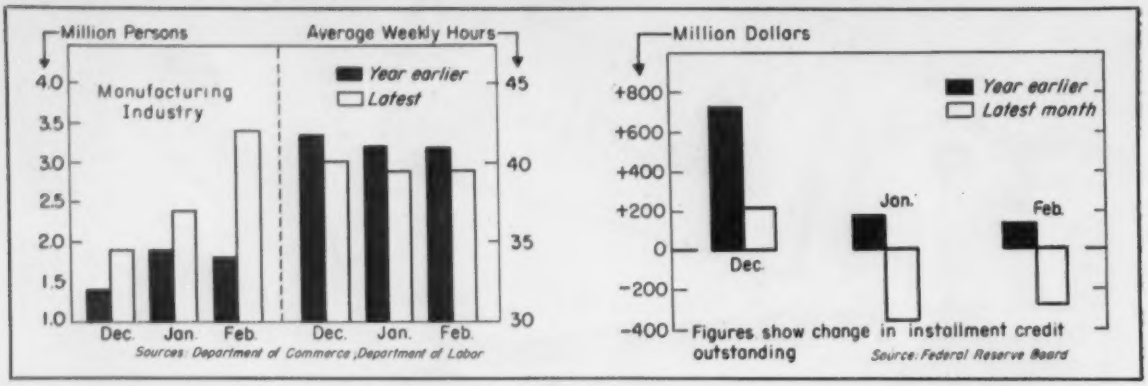

Unemployment . . . less overtime pay . . . cut into installment purchasing

Consumer Buying Down the Middle

The consumer's part in the current slow business downtrend is beginning to be clearer. It looks as if consumers will disappoint both the extreme optimists and the extreme pessimists in 1954.

Extreme optimists have counted on consumers to take up the slack as spending by others—especially the federal government—declines. Since consumers buy about two-thirds of all goods and service produced, even a slight improvement in their buying would offset big declines in other sectors of the economy.

Consumer Buying Cut? . . . On the other hand, pessimists are afraid that consumers will cut their buying sharply—either because their incomes decline or because they are afraid of a depression.

Neither of these extremes seems to be taking shape so far. Up until now, consumers have been following a middle course—cutting their spending a little as their incomes slip a little, but not cutting by much. Signs available indicate they will follow this path right through the year.

Retail sales in late 1953 and early 1954 have been slightly below the levels of one year earlier period. December and January fell 3% behind the year-earlier period, and February was 5% short of a year ago. The larger decline for February, 1954, is accounted for by the fact that February was the highest month in 1953.

Personal incomes have declined in every month since last July, except for October. So far, the total decline is slight —less than 2%. But it's enough to affect sales.

Actually, incomes are still a good deal higher than they were a year ago, even though they are down from their peak. But people are spending more for services like rent, electricity and medical services. The costs of consumer services rose by $5.7 billion last year; they are probably at least $5 billion a year higher now than they were then.

Finally, consumers are not borrowing as much as they did a year ago—and that cuts further into sales, especially sales of durable items like cars and electric appliances. Two reasons for the lower rate of borrowing are shown on the chart above—they are, unemployment and less overtime pay.

Thus, consumers are buying smaller quantities of goods because their incomes are down, because they are spending more for services, and because they can no longer borrow as much as they did last year. But there is no sign that fright—what the pessimists feared—has anything to do with slower sales.

Eyes on Consumer Income . . . These trends are likely to continue as long as consumer income continues its slow decline—which may mean through most of 1954. But if sales continue to follow this path, 1954 will still be one of the best retail sales years on record.

The latest survey of consumer finances by the Federal Reserve Board adds weight to this prospect. In general, consumers indicated that they plan to buy about as much this year as in 1952—a good year—but somewhat less than in super-good 1953.

In the past, consumers have stuck pretty closely to the spending plans they reported to the Federal Reserve Board —although, as the Board points out, there's always the chance they will change their minds.

But if consumers stick to their plans, it's clear that they will go right on disappointing both the optimistic and pessimistic observers. Their buying plans are squarely in the middle of the road, just as their buying has been up to now not exuberant, not panicky—and not far from the record levels of 1953.

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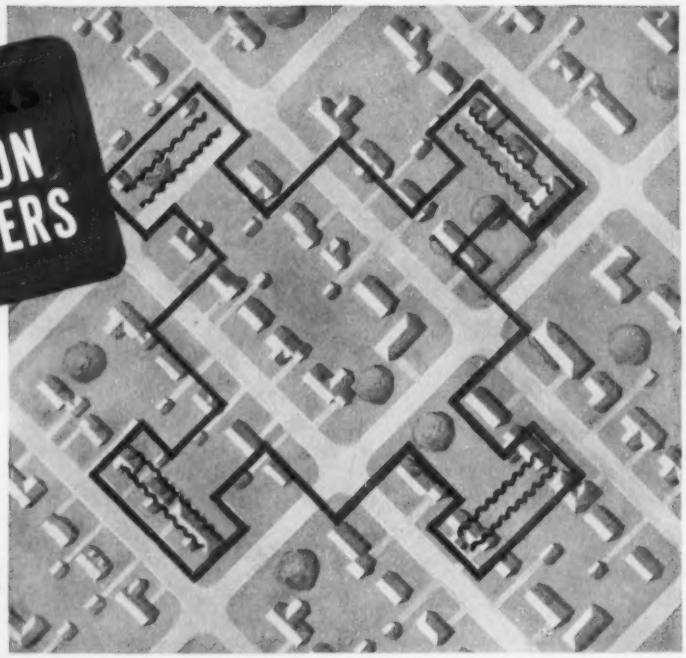

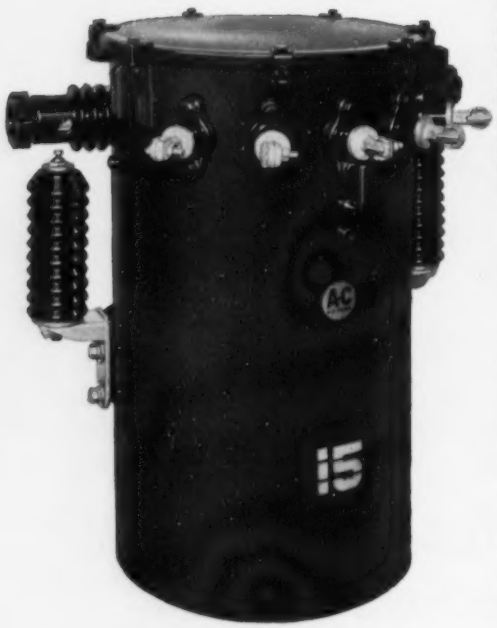

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